CHICAGO PAPER WEEK NUMBER

MEMBER OF THE A. B. C.

FORTY-NINTH YEAR

PAPER TRADE JOURNAL

THE INTERNATIONAL WEEKLY OF THE PAPER AND PULP INDUSTRY

ESTABLISHED IN 1872

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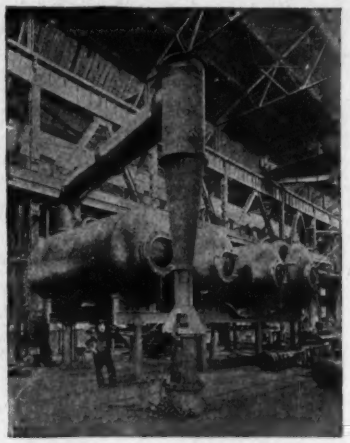

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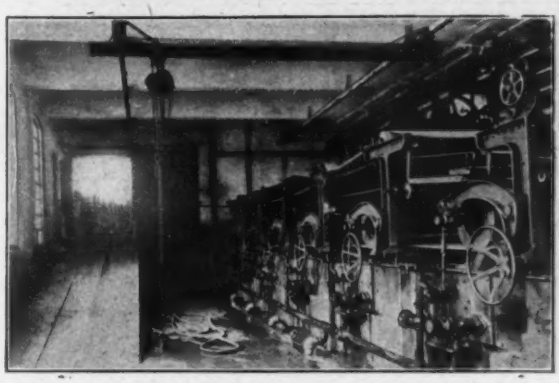

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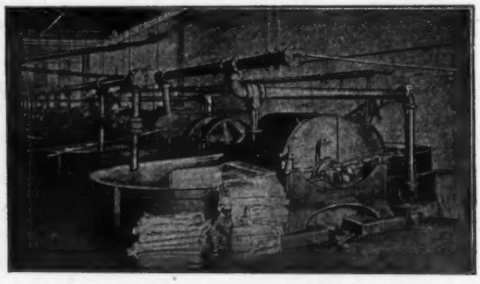

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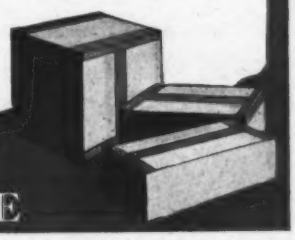

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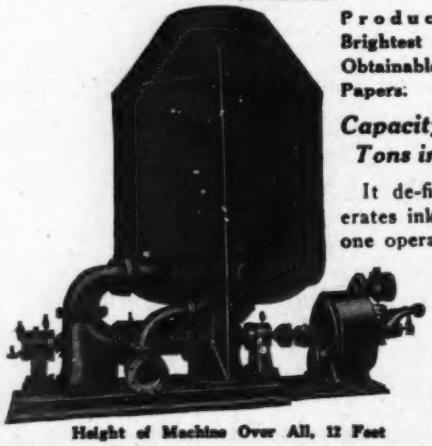

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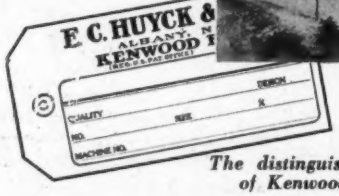

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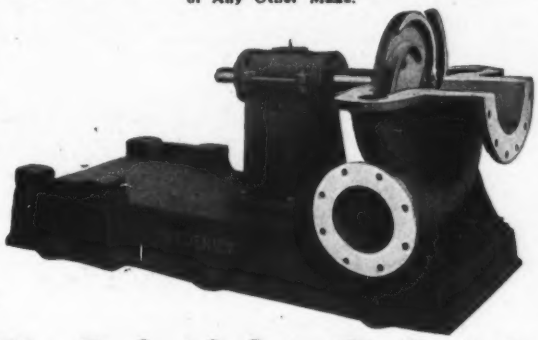

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FORTY-NINTH YEAR

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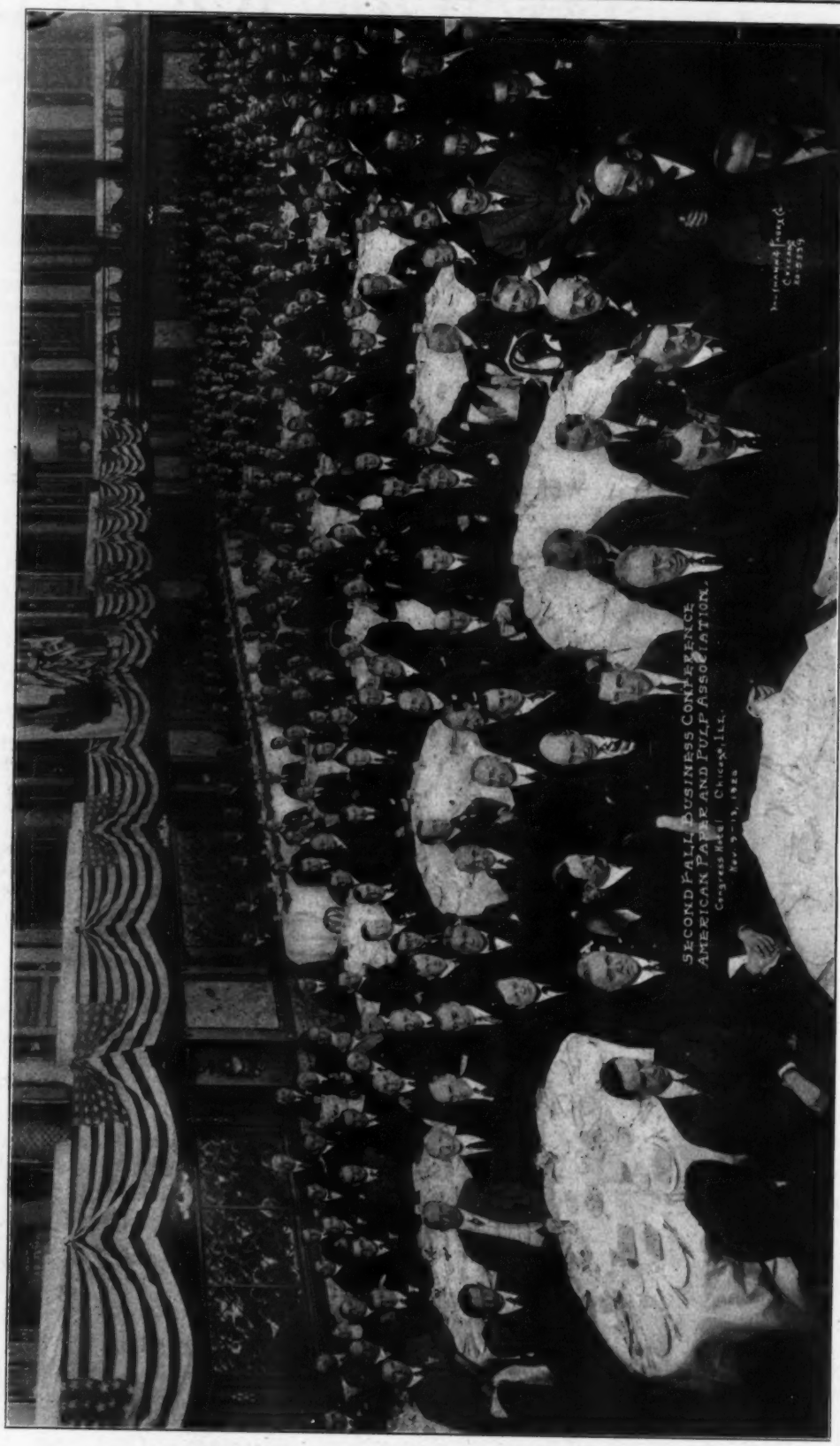

PICTURE TAKEN OF THE LUNCHEON OF THE AMERICAN PAPER AND PULP ASSOCIATION AT THE SECOND FALL BUSINESS CONFERENCE, CONGRESS HOTEL, CHICAGO, NOVEMBER 12.

PAPER CONFERENCE AT CHICAGO IS BIG SUCCESS

Meetings of the American Paper and Pulp Association Are Unusually Well Attended and Many Topics of Timely Interest to the Trade Are Discussed—Forest Conservation Receives Unusual Attention and Woodlands Division of the American Paper and Pulp Association Is Formed —Interesting and Helpful Addresses at the Conference

[FROM OUR SPECIAL REPRESENTATIVE.]

CHICAGO, November 10, 1920.—The second Fall business conference of the American Paper and Pulp Association opened here today at the Congress Hotel with the largest attendance of any meeting excepting that of April last at the Waldorf-Astoria in New York. The morning was taken up with sessions of the National Paper Merchants Association at the Blackstone Hotel, while the Paper Board Manufacturers, the Waxed Paper Manufacturers were holding separate meetings at the Congress Hotel.

The meeting of the latter was devoted to a discussion of the foreign sulphite situation with interest chiefly in the future supply from abroad. The matter of credits was fully gone into and it was the consensus of opinion that this branch of the industry had no complaint to make of the financial situation. Information, Co-operation and Confidence were the principles universally expressed as being the foundation for the success of every trade organization and the discussions of those attending were heartily in accord with the carrying out of these principles.

An important action taken by the boxed Paper Manufacturers was that of revising present trade customs which will later be adopted on recommendation of Attorney Henry A. Wise of New York.

Executive Committee Needs

The executive committee of the American Paper & Pulp Association held its quarterly meeting during the afternoon during which addresses were made by Secretary Hugh P. Baker, Dr. Julius Stieglitz of the University of Chicago, Dr. Hollis Godfrey, President of the Drexel Institute of Philadelphia, D. Clark Everest of the Forest Products Laboratory and Lawrence F. Sherman, Secretary of the National League of Industrial Rights. Forestry Conservation was the subject uppermost in the minds of those present and the organization of the Woodlands Section of the American Paper and Pulp Association received the hearty endorsement of the committee. The perfection of the organization is referred to in another part of the reports of the convention.

During the meeting of the executive committee the following addresses were made:

PAPER MANUFACTURE IN RAW MATERIAL

The following remarks on "Paper Manufacture in Raw Material" were made by Dr. Baker, Secretary of the American Pulp and Paper Association:—

On the basis of statistics got out by the Federal Trade Commission since the outbreak of the war, it is estimated that for the present year there are over 110,000 persons engaged in the manufacture of paper in this country, that the capital invested is approximately $900,000,000 and the value of the product approximately $850,000,000. It will be seen from these figures that the paper industry ranks with the great industries of the country—in fact, it stands sixth among our industries in the value of the annual product and in capital invested.

Should one follow paper from the manufacturer to the consuming public, the amount of money invested, the number of persons employed and the value of product would be very much greater than the figures already mentioned. That is, if the paper should be taken through the converter, the merchant and the retailer to the consumer, the steps involved in the aggregate places the paper industry before the country as one of the very important industries to be considered in the business activities of the nation.

The best returns available on materials used in the manufacture of paper shows that over 90 per cent. of the paper manufactured in this country today is made from wood—more than 84 per cent. of the total pulp manufactured in 1918 was made from four different kinds of wood, in amounts as follows: Spruce, 55 per cent.; Hemlock, 16 per cent.; Balsam, 7 per cent.; Poplar, 6 per cent.

Some of the pines and various hardwoods, such as birch, maple, gum, have been used by the mills in this country for considerable time. It is probable that much more hardwood will be used in the future in the paper industry than has been used in the past, and this not because the hardwood is especially adapted to the manufacture of paper but because it is available where the supplies of soft woods such as the spruce and fir are rapidly disappearing. It isn't likely that the relative amounts of wood which went into the manufacture of pulp in 1918 have changed during the past two years.

As important as are the other raw materials going into the manufacture of paper such as rags, chemicals, etc., it is proposed in this statement to confine the discussion to wood as the important raw product in the paper industry today. It would be taking coals to Newcastle to attempt to discuss here the various processes used in reducing wood fibre to pulp. These processes are thoroughly well known and they will continue to be used much as in the past in the reduction of wood fibre for the paper industry.

The Forests of This Country as a Source of Wood for the Paper Industry: To describe effectively the forests of America, past and present, the time allotted me for this brief talk would be altogether too short. When our fathers landed upon the Eastern shores of this country, they found the finest forests that white men had ever seen or at least had ever written of before. No such forests were familiar to our fathers in the older countries of Europe and Asia. Our people came from countries in which the forests were already disappearing and some of the first rules and regulations made in this new land were for our forests.

As early as 1614, Exeter, which is now the State of New Hampshire, passed rules and regulations for the protection of her forests. In 1682, William Penn ordained that the grantee must keep one-sixth of his land in forest and as early as 1783, every one of the thirteen colonies had forest fire laws. The struggle through which our fathers went in subduing the forest in this new land that they might get at the soil to produce food and other products, was a tremendous one. They found very quickly that the forest instead of a friend to be guarded and perpetuated, was an enemy to be gotten rid of as rapidly as possible. They found the forest filled with wild animals and wilder men and their very existence in this new land depended upon their pushing the forest away from in front of them as they advanced.

Very early in the development of the nation, hardy explorers came back from the great Ohio Valley and the Jesuit Fathers wrote from the northern lake states of the wonderful forest to the westward so that along with the idea of the forests as an enemy to be gotten rid of as rapidly as possible, there developed the idea of the forest as an inexhaustible resource.

Our fathers said, "Why should we take care of the forest when it stretches westward no one knows how far?" Some day the part which the forest has played in the development of this great nation will be put into story, and the story will be an important part of the history of the land.

Down through the years the forest has been gotten rid of and our attitude has been one of commendation for the great lumbermen who could sweep the most forest away in a given time. Now we have reached the time when the forest and its products are absolutely essential to the permanency of our industries. The feeling that so long as our virgin forests existed we need give little thought for the morrow has brought us to a time when we find that the people of the entire country are awakening suddenly to the realization that a great natural resource has been expended and that it must be replaced, and that promptly, if our industries do not suffer possibly to the point of extinction.

In considering the value of the forests of this country in the upbuildng of our industries, we must not lost sight of the fact that, unlike many of our other natural resources, the forests are renewable resources. That is, even though we have destroyed the virgin forest, the forest land remains. In a state like New York which originally was covered with one dense forest, except for waterways, while we have but little of the original forest remaining, we have a tremendous area of land available for a new forest.

Out of thirty millions of acres of land in New York we have under the plow today but fifteen millions of acres, less than a third of New England, is being farmed today. Down in Pennsylvania out of twenty millions of acres we have under the plow ten millions of acres. These figures are enough to show that in our Eastern States we have vast land areas than can be made productive through reforestation, through the putting back of the forest where it grew originally and upon land better suited to the growth of a forest than any other crop from the soil.

New York will again become a great forest state. New England will be one of the finest forest regions of the world. The hills of Pennsylvania will support a forest that will make it possible for Pennsylvania to increase the paper mills and increase generally her industries dependent upon the products of the forest. It is not such a difficult matter to rebuild the forest.

Forestry Essential to the Paper Industry: Even though we have had forest schools in this country for a quarter of a century, and although numerous associations have been publishing journals devoted to forestry, yet the man on the street in this country today must have forestry defined. He knows that it has something to do with trees. In more than that he is ignorant.

Forestry means the businesslike handling of a crop of trees from the soil; it means not only maintaining the productivity of our forest soils, but increasing that productivity. It is a very ordinary economic problem and a problem which, in the near future, will be solved more easily than are many of our agricultural problems and it is a problem that will demand, yes, and more, will attract the best men of the country, and the solution of the problem will give results that will be so far-reaching that those of us who live to see something of the solution of the problem will wonder how it is possible for the American people to delay for so long a time the proper practice of forests.

The virgin forest, like virgin soil, is not productive. The best of the rapid growing young forest in the Adirondack region today is producing wood at the rate of about two hundred board feet per acre per year. Quite ordinary forest under proper management in Germany or France before the war was producing as high as twelve and fourteen hundred board feet per acre per year.

When the first settlers went on to the prairies in the middle west, they cut a half a ton of grass from the virgin prairie per acre per year. They put their plows to the soil and planted the tame grasses and cut six tons per acre per year. We can make the forest soils of this country several times as productive as they ever were as nature handled them.

Some if the states have already made a very good beginning in the practice of forests. The great State of New York, owning as it does nearly two millions of acres of forest land, last year planted approximately 4,000 acres. This may seem like a very considerable planting, but it is a small beginning as compared with the amount of land that needs planting in this state.

It is probable that the forests of the future in our eastern states will be very largely made up of rapid growing evergreens such as the spruce, pine and fir. On ordinary cut-over, burned-over land, a new forest may be started easily. The young trees which are grown from seed in forest nurseries are put on the forest lands when they are from twelve to fourteen inches high. Two or three men, depending entirely upon the character of the soil and the topography, will plant a thousand trees a day. If we plant trees six by six feet each way, we put out 1,210 trees to the acre. The cost of trees and labor today will range from twelve to sixteen dollars an acre. We must, of course, if we are to put the practice of forestry upon a business basis, figure our costs at compound interest and even at compound interest we could afford today to begin wide-spread planting of our forest land.

The Permanency of the Paper Industry Assured Only When Forests Are Permanent: It seems a too simple statement to say that an industry is dependent upon a fixed supply of raw materials. Can there be any question that the paper industry of this country will be permanent only in so far as it can be assured of a permanent supply of wood? It is a makeshift arrangement, a living from hand to mouth for the paper industry of this country to depend upon Canada or upon pulp which may be brought in from the Scandinavian Peninsula or elsewhere. The industry is big enough and important enough to demand that the states and the National Government at least assist in making its supply of wood permanent. Organizations of other great wood using industries are coming to this same conclusion that to be permanent they must work aggressively for the restoration of our forests. By the combined efforts of the industries which are dependent upon the products of the forest, we can easily bring about National legislation and legislation within the various states that will go a long way toward insuring them wood for the future.

The man on the street who knows little of our forests or of our industries dependent upon the forests is sometimes very ready to charge the paper industry with the destruction of forests. It is well to remember that with all of the wood which is being used today in the manufacture of paper, only eight or nine per cent. of the wood cut from our forests actually goes into the paper industry. The other ninety to ninety-two per cent. is used in the manufacture of lumber, destructive distillation, that is, the production of wood alcohol, etc., or for other purposes, but even though the paper industry takes a scant ten per cent. of the wood coming from our forests annually, this scant ten per cent. is absolutely essential for its permanency.

There are trying times ahead of the paper industry because of the thoughtless way in which we have forged ahead assuming in our good-natured American way that somehow wood would be forthcoming. We are in the midst of a great scarcity of wood for the paper industry and this scarcity is going to continue until forestry is so generally applied to the forest lands of this country that we may depend upon an annual return from the forests as we secure annual returns from our agricultural crops.

The next twenty-five years are going to be lean and difficult years for some of the industries dependent upon our forests for their raw materials. Canada will help, but we will pay well for that help. We will pay even better for the help which we get from the countries in the north of Europe.

It would not be out of place to speak of Alaska here as a possible source of wood for the paper industry. Alaska has great forests of soft woods but Alaska is a very long distance north of Seattle and while the Alaskan forests will eventually furnish pulp for the making of paper in this country, the development up there is coming slowly because of inaccessibility and distance and it is

going to be expensive to bring the pulp from Alaska overland or by water to the mills of the eastern states.

Pulpwood and pulp are not going to be materially cheaper over a period of a decade. There is not a manufacturer of paper in the country who is not ready to stand up and fight for the permanency of his industry. This means that he must count himself in with those who are ready to demand proper use and development of the forest lands of this country.

What the American Paper and Pulp Association is Doing to Make the Industry Permanent: You have been told several times in the past of the efforts of the American Paper and Pulp Association in developing a national forestry programme. The Association has been very fortunate in having a very able committee on forest conservation with a secretary whose interests may be said to be primarily forestry. This secretary, Mr. R. S. Kellogg, Secretary of the News Print Service Bureau, has done a splendid piece of work in gradually bringing the manufacturers of paper in this country to the point where they are ready to accept a very advance programme for the development of forests. Conferences held in New York this fall have brought the wood using industries of the country together to such a way that it is probable that constructive legislation will be introduced in Congress the coming winter, and legislation of such a character that it can be supported strongly by all of the wood using industries and by the users of paper through such organizations as the United Typothetæ and the Associated Advertising Clubs of the World. The American Paper and Pulp Association and the paper industry generally in this country will have a great deal of reason to be proud in the years to come of the advanced stand which they have taken in this matter of the application of forestry and of the way in which they have been able to enlist the support of other industries and at all times to be practical and constructive in the suggestions which they have made.

To a forester who has been struggling for twenty years to bring about a better understanding of the need of forestry, it is tremendously significant that you and others gathered together in meetings of associations in Chicago this week should be willing to listen and should be ready to take action in the matter of a forestry programme for the nation—a programme which, if carried out, will insure the permanency of our industry for all time to come.

EDUCATION

The following address was given by Dr. Hollis Godfrey, President, Drexel Institute, and a member of the American Council on Education, before the Executive Committee Meeting of the American Paper and Pulp Association:

I am sorry that Colonel Franklin can't be here to attend to this himself. I want to tell you that his advice and counsel at every step has been invaluable.

It has been four years now since we first started on this work in Washington. At the end of the war we simply decided to turn our activities to keep the organization together because unquestionably there has never been collected in the world any such mass of material as we have in our files, nor any such acquaintances as we had. I knew personally at the end of the war, 300 of the administrative officers of colleges who had been in and out of my office during the war. You know what that acquaintance means, to be able instantly to know the man. We had every course in every college listed and in our files. We had not only that but we had 720 of the reports of the commissions on education of all the other countries, because all their reports came through my office.

It seemed to me absolutely a crime to waste that great mass of material and such an organization as we had, because really what I have done is merely to stand back of the organization and see them go. I had the most wonderful organization in the world, I believe, at the end of that time. All the men were professors and managers and they knew how to organize curriculum as well as teach. Most all of them had been in industry from three to five years. It was very remarkable that they should have come together in that way, so at the end of the war I said to the fellows, "We simply have no business to let this thing die. It's a great resource to the country; let's go on, keep our record up and we will go out to the industries and ask them to help us on this situation, first to make a survey, find out what the facts are of that change over from war to peace and then to keep the organization going."

It has been almost exactly two years since the armistice was signed and in that time we have been in 220 plants and talked to the executives and the foremen on the floors of those plants, from Toronto to Galveston. We are talking on the floors of the shops just as much as we are talking from inside the college.

Now, we have come through to three things: We want to aid the student first to get the maximum return for his undergraduate year, so that if he is going to enter industry, he will get the maximum amount for himself, the man who employs him and the college who trains him. That is what we are after. We know it is absolutely needed. I don't have to discuss that with you, I am sure. You have got to have trained men to do your business today. Industry can't go on without the trained men; you have got to have power; you have got to have trained minds to solve the problems in the next five years.

We have had an extraordinary experience. The way in which it was received by the colleges has been the most amazing thing. In less than two years we were able to get the official recognition of the American Council on Education which is the central body of all the colleges and universities in the United States. That is the first time that the colleges as a whole have ever recognized industry. It is a very remarkable thing. It has reached a point where it is a great business, and it is growing so big that I have got to give my major time to this situation because it is evident that the demand for it is absolutely immediate. I have been going out day after day and speaking to different groups and spending a lot of time at it, and those men want to know how they can serve industry and want to know very definite and specific things.

We have had a brief history of the paper trade, which was one of the most illuminating things, multigraphed and sent to the different people who wanted to know about it. It is a most fascinating and interesting story. The result is they are becoming interested in industry.

I was talking with the Dean at Harvard last week, and they are going to train every man fundamentally and generally for industry. Pittsburgh, on the other hand, is training them more and more for specific industries. Now, that is bringing up a whole lot of experiments as to how to turn out the best finished product in the end, and we are giving the tools to work out every one of those experiments.

There are all kinds of resources in industry which the colleges know nothing about and which can only be obtained through this means. We never interfere with the policy of curriculum. We only give them tools to build their curriculum for the management of industry, but it is working day in and day out, it is going through. It is just as much a running and going part as any of your paper mills today, without exception, because we are turning out the finished product. I will admit it is crude at the present time, but at the same time it is coming out and doing the job; there is no question about that.

I have today fifty specific orders from first-class papers for articles on this subject. We are getting for the first time a nation-wide interest in this.

Now, the thing that I want to get—I am out here because Colonel Franklin's suggestion on that situation is that we need a budget of $100,000 to carry on the work the way the work has been

done, and that means $5,000 from a group of associations for three years—$5,000 a year for three years. The way the financing has been done up to the present time has been in three different groups. In the first place, some great companies have taken it for themselves, for instance, the Pennsylvania Railroad made their preliminary subscription as the Pennsylvania Railroad. That is one full-sized job in itself. The U. S. Boot and Shoe Association raised the funds among their men but the association sponsored it.

Colonel Franklin desired me to present the thing to the association because we are convinced that it is the sort of thing that the association ought to bear.

We have got a big shortage; there is no question about it. I don't want to emphasize that too much, and I don't want to publish it because it is too dangerous. Do you realize that we dropped forty per cent. during the war on our college graduates? Our whole reserve from abroad was wiped out.

We have got a situation which I don't want to emphasize in print too much, and I don't do it because I don't think it is good business, but the fact is that we are facing a very serious shortage. Every single man in my own college was taken by March before graduation, and we simply had men sitting outside the Dean's office and saying, "We will take any man you recommend." There wasn't a man left after March of last year. You can see something of the situation. You will find college after college of that type.

Now, the only way I know we are going to do is to increase production and improve quality for productive use. That is the whole sum of the substance. That is what we are doing and we are doing it in absolutely practical ways that come through, and we have experienced it long enough to know the thing goes, and really that is the whole story.

National Research Council

The following facts were given by Dr. Julius Steglitz of the University of Chicago, on the work which the National Research Council is doing to bring about the publication of a physical chemical constance.

I am glad to have this opportunity that Dr. Baker has kindly arranged for. I am sorry that the chairman of the Trustees, of which I am one, Dr. Hugh K. Moore, is not here because he could give you many more specific ideas of the value of constance for your own industry.

Let me try to explain our objects and plans by stating that the war brought out the fact that research is invaluable for the development not only of our industrial resources, but also our governmental work. The investigators themselves found that one of the greatest difficulties was that they could not lay their hands on what we call the physical and chemical constance, such constance as specific heats, not only of the common metals but of wood and paper and cement. Those are extremely important in determining the amount of heat required to heat up a new vessel or container, and the amount of heat that would be wasted. For instance, it appeared that we might have a more direct method of combining carbon directly with hydrogen and that problem was given to one of my former research students, Dr. Kime, of Pittsburgh. Now, by having these worked out, it saves a great amount of time and money. Germany had a constance but these tables are primarily for industry and there are a great many instances in this country in which the Germans are not interested and so the constance was altogether lacking there.

There are, of course, quite a number of constances which have never been determined. They were to a certain extent determined during the war but there is a great deal of new material now.

We want to collect and publish as soon as we can a critical volume, a volume of critical tables, and select the constance which are particularly of use to the men of this country. That undertaking appealed to the National Research Council, which is a voluntary organization with headquarters in Washington, whose specific object is to foster research in all branches in this country, to bring those who are interested in one special line of research in together and get the work started.

Dr. Moore is the chairman of our organization, and we are all serving without pay, of course, as a contribution to the work.

As a chemist, my chief object is to see America independent. We have been dependent on other countries too long.

We need these constances in English, in a well collected form and critical. I would like to put the emphasis on the word "critical."

In conclusion let me give one illustration from your own field of effort. I think Dr. Moore is the investigator who made use of this process. He found in his paper mills that there was enough dextrin and other organic matter to make it worth while for him to estimate the heat value, and he found that it would be worth while to evaporate the solutions and use the residue fuel, and I understand that made a difference between a large loss of millions of dollars and a very large net gain on the other side of the ledger. He calculated with the aid of such constance the amount of heat that was being wasted every day by letting this organic matter run away. I believe the residues contain sulphite that can be used over again—a remarkable, efficient and economical process.

One other word and then I will be glad to have you ask questions. In my own experience with the industries, they are now establishing research laboratories in which they have not only chemists but physicists.

What we would like would be a resolution by the Executive Committee recommending the project of your members to the firms and associations which are represented here. We are trying to raise $150,000. We have quite a large proportion of that, but we need still more, and we feel that the industries which are going to be benefited are the ones that ought to contribute to this work. As I stated, the trustees themselves are doing this as their contribution to the cause.

ACTIVITY OF FOREST PRODUCTS LABORATORY

The following talk was given by D. Clark Everest, of Madison, Wis., on the activity of the Forest Products Laboratory, November 10, before the Executive Committee of the American Paper and Pulp Association.

Dr. Baker has given me a few moments in which to present the statement of the activity of the Forest Products Laboratory, and why, in my mind, the American Paper and Pulp Association ought to endorse and support, both morally and financially, the work of the laboratory.

First, I wish to present briefly the various subjects which have been studied at the laboratory, which I believe you will recognize as of benefit to us. The first work of general interest was the experfimental work on all classes of wood in the grinding process and the preparation of paper samples made from these various woods, together with the data relative to grinding and the comments as to the suitability of same for commercial purposes. This publication is only one of its kind, and has been quoted and used by practically every practical and technical man in dealing with ground wood problems since its publication.

The study of uniform cooking methods and sulphite processes has been of great value. The utilization of cotton linters for the manufacture of pulp has been demonstrated successfully.

Studies of the use of grasses, straw, and other crop plants have been made, and while no particular gain has been made by the addition of new paper making materials, it has demonstrated that some of them are not suited to the work and has shut off work

on certain materials which only meant waste of time on the part of many individuals.

The reworking of old papers which have been previously treated with asphalt, paraffin and other materials has been studied and some progress made in the recovery of the saturating or coating materials.

The recovery of by-products from soda and sulphate processes is being studied and promises good results, particularly on Southern woods. The determination of proper refractory materials for the lining of smelters in sulphate mills has been of great benefit to that branch of the industry.

The study of aluminum sulphate substitute is of interest to every manufacturer.

The study of fibre losses is also of interest to the entire industry. The substitution of niter-cake and salt-cake in the sulphates industry promises some relief for the craft manufacturer. Sulphite liquor utilization for various purposes and the use of hemlock bark for tanning are of utmost importance and good progress has been made in that work.

Bleaching of sulphite and sulphate pulps and the proper preparation of both classes of pulp for bleaching are subjects under consideration and on the bleaching of sulphate particularly have yielded good results and benefit the trade.

The laboratory personnel have continually urged the adoption of uniform pulp wood pure specifications and methods of measurement, and while this work is being carried on, I believe, by this Association, the laboratory is anxious to help in any way possible.

Lumber mill waste utilization is also a thing which has been studied and one which, as time goes on, will be of increasing importance.

These are but some of the problems attacked by the laboratory and there are many others which have proven of great benefit to those of us who have made use of the laboratory.

The problem which has been most interesting to me has been the study of the deterioration of pulpwood and wood pulp and this is in my mind the greatest problem we have to face today. The study of this subject was begun on infected wood pulp but it soon became evident that the cause of the trouble was infected pulpwood, and this led us back to a condition which every one of us knew existed and which no one took much pains to check. For the amount of loss involved, I believe, less expenditure of gray matter and money has been made to correct the deterioration in pulpwood than any other item connected with the paper industry. This has been the case in the pulp industry, wood was stacked in short lengths in large piles, other wood piled on top of it before the old wood was exhausted; wood piled in wet places or in yards filled with decayed wood and bark—the yard foreman in most instances was the boss as to the handling and location of wood. There may have been exceptions, but the general condition in the industry was and is today as stated. I will guarantee that if the same conditions existed in any other part of the plant or yard as existed in the woodyard that every manufacturer would move heaven and earth to correct it, but as it is they go blissfully on in ignorance of the actual loss they sustain daily through the improper handling of pulpwood.

When I realized what this thing meant, I took up with the laboratory the subject of an investigation of the causes of wood pulp decay and learned that their government appropriation was practically exhausted and for lack of funds they were unable to secure the services of the necessary pathologists and others to make this study. I also found that the study of various preventive methods would take possibly two or more years and long time tests must be made to determine the results of each particular treatment. I realized that some of us at least were losing a great many thousands of dollars annually and that if we were able to save six months' time in the solution of the problems that it would save for us many times over any donations we might make for the purpose.

It was absolutely an established fact that the governments were not available nor could they be provided for nearly a year, even if appropriated at the next session of Congress. There seemed to me to be but one thing to do and that to appeal to some of my friends in the industry for a donation to help out the situation and accordingly I sent letters to those who I thought would be interested. I was successful in raising $10,300 which has since been increased by $500 from another manufacturer who was in Madison and became interested in the work being done.

In this canvass for funds I received considerable commendation and likewise considerable criticism. I met with some sarcastic remarks relative to self-appointed committees by persons who seemed to be more interested in commenting on the methods employed than in investigating the benefit of the work for their own individual business. Also, several stated the government ought to do it. There was no argument about that but the government had not provided adequate funds and from my observation of the government as then conducted, the fact that it had failed in this one particular was not startling, neither was there any assurance that the government would ever rectify conditions, and I desired to get action before the organization at the laboratory was completely broken up, as it bid fair to be at the time.

Perhaps I was at fault in not taking the matter up with this Association and working it out through official channels, but I will say frankly I never thought of it. The Association as such had not to my knowledge functioned in that way. I did have the matter up with Mr. Sisson and we corresponded for some time relative to matters but only in a personal way.

The most gratifying feature about the whole thing is that we are getting results and that I think every one of the contributors to that fund would be willing to pay in a like amount again to carry on the work, knowing what is being accomplished.

The loss from infected pulp is evident not only from the direct loss when the pulp is entirely unfit for use, but in the loss in quality and production from the use of partially infected pulp. The loss from decay of wood is not so evident especially if it is considered that in general wood is bought on a volume basis and the finished product is sold on a weight basis.

Practical mill runs on grinding normal spruce wood held in the usual storage piles for about a year and a half showed a loss of over 300 pounds bone-dry pulp per cord of rossed wood in comparison with sound wood. Tests by the sulphite and sulphate processes gave similar results. That is a mild condition as badly infected wood showed a loss of over 300 pounds upon dry pulp per cord.

This condition not only affects the mills making pulp but practically every converter in the industry.

This Association has endorsed a national forest policy which in its preamble states, "Wood is a basic material in our industry," and "We can no more conceive of a state of society in this country with wood totally eliminated than we can of one in which iron has no part."

The last session of Congress did not provide funds for the laboratory and it is necessary, if they are to continue this work, to a conclusion, to have an additional $10,000. So far, the laboratory has spent an amount equal to that which we previously donated, but they cannot go further. The pulp and paper portion of their appropriation is exhausted. At the next session of Congress dealing with appropriations, members of the paper industry must see that adequate provision is made, but in the meantime, I appeal to your committee to endorse this work and to undertake through your efficient secretary the raising of this fund, the results of which are so important to the industry.

I hope this will be done and that it will not be necessary to go outside of this Association for the handling of any matters which should be financed by the industry.

SECOND DAY'S SESSION OF THE CONFERENCE

The second day's session of the conference was held promptly at 10 A. M., and attended by the largest gathering which was ever present at an opening meeting—a feature the more remarkable because of the fact there were no side attractions to draw those present. The general business situation and how it is to affect the paper and pulp industry was the magnet which brought the large attendance. The meeting was opened with an address by President George W. Sisson, Jr., who spoke of the large attendance, and complimented the members for the interest they had shown by their presence.

Address of President Sisson

George W. Sisson, Jr., president of the American Paper and Pulp Association, made the opening address as follows:

"If any demonstration of the increasingly important and dignified position our great industry is assuming in the industrial activities of our country were needed; if any proof of the intelligent and sympathetic interest of our members in the cooperative study of the pressing problems of our own industry not only but those of all our nation were lacking, they might readily be found in this gathering of earnest, interested men who have come together to consider thoughtfully the larger needs that make for the welfare of our industry and of our entire country. Here, during this week of meetings and conferences, through interchange of views, where mind meets mind, where our ideas are clarified, there may come that settled conviction as to the right procedure so essential to wise and efficient action.

A. P. & P. A. Proving Its Usefulness

"It is a matter of congratulation that the American Paper and Pulp Association is now proving its usefulness as a practical working organization, rapidly extending its influence and earning the ever widening support of all phases of the paper industry. Prepared for particular service to the various branches of the industry through its affiliated organizations, all of which are doing most effective work in their respective fields, work which the parent association is not equipped to do, and indeed should not do, it finds its greatest usefulness in seeking solutions of those common problems which touch every branch of the industry so vitally and many of which will receive particular attention today. There may be those who feel that the industry is becoming overganized, but the best answer to that would be a recital of the actual results in practical service rendered by these 18 organizations, each of which touches its particular branch of the industry so intimately. We should not, however, confuse this type of service with that broader field of operations in which the American Paper and Pulp Association finds its proper sphere of activity.

"Your officers and the executive committee, all of whom are in close touch with the work of the affiliated organizations, are now engaged in a careful study and analysis of these organizations in their relation to one another and to the industry in general, in the hope that a constructive program for future activities of growing usefulness may be evolved, and one which will set an ideal toward which we can work over a series of years. We should not be simply opportunists in our association work, but should make a broad survey of present conditions and future possibilities that we may lay down some such broad plan of operation as will not only avoid duplication of effort and expenditure, but lead to tangible results along the definite course we may map out.

"The cumulative influence of these many organizations can only be concentrated and brought to bear effectively upon these common problems through the American Paper and Pulp Association. During the past year we have had examples of this very type of work, problems of Governmental relations, Federal taxation, income tax matters, raw material supplies, indeed the very survival of the industry in the United States have been before us as problems on which we must bring to bear the best that is in us.

"It is being very forcibly borne in upon me these past few months that the big job of the American Paper and Pulp Association is to see what can be done to perpetuate this industry in the United States, and it is my feeling that those who are too ready to give up the ship and to say that the industry, particularly in the northeast, must be scrapped, and who are not ready to fight to keep the industry on its feet in this country, are not imbued with the true American spirit. There is no doubt that the great problem before the industry in the United States today is its raw material supply, and that the study of this problem in all its phases, both as to temporary relief and guarantee of future supply furnishes the one big pressing job for the American Paper and Pulp Association.

Awakening to Critical Situation

"It is no news to this audience that this country has but recently awakened to the actually critical situation facing the pulp and paper industry. This realization has come as somewhat of a shock to many and to the general public who have in the past paid little or no attention to the matter so long as their needs were served. It would doubtless be true to say that the alarm over the pulpwood situation, while well founded, has been somewhat over-done so far as its psychological effect on the wood and the pulp market is concerned. It is no time for either the industry or the public to lose their heads, but rather to make a careful and earnest survey of the situation and evolve from this study some policy that will, perhaps, not correct the trouble very soon, but through which the crisis can be tided over and an ultimate and permanent solution found within a reasonable length of time. Our industry touches so closely the daily lives of the people and reaches such a condition of indispensability in our modern life that we must approach the problems touchings on raw material supply with a strong consideration for the public interest involved and with a determination that our efforts in the interest of the public must be so widely directed that no minor considerations or controversial attitude may interfere with a successful result.

"It is with this thought in mind and in this spirit that the American Paper and Pulp Association, through its committee on forest conservation, has been considering this matter. I will not attempt to forestall the report which the committee will bring you today showing most laudable progress in not only evolving a program that promises to be effective, but in enlisting in such program the united support of many interests whose views in the past have been quite divergent. The discussions today will bring out the more prominent phases of this truly constructive program and it is my earnest belief that bills now in preparation covering its principal features will find approval at the hands of the National Congress and in State Legislatures.

"While it has been pointed out that there are promising possibilities for pulp and paper developments with ample raw material within our national domain in regions like Alaska, our immediate problem is that of serving an already established industry and meeting the emergency in localities where we thoroughly believe steps *can* be taken to protect those industries and guarantee the continued existence of prosperous industrial centers which are the homes of busy and happy American citizens. It is to this problem, gentlemen, that we as citizens, as well as paper and pulp manufacturers, must address ourselves. In our northeastern states where the industry is concentrated to a degree found in no other section and where the forests have been heavily over-cut for many years, there are, perhaps, more pressing reasons for some immediate or early form of relief if the industry is to continue. It is

certain that within this area the industry cannot operate at full capacity without the *importation* of a large percentage of its wood, and the condition of the forests demands immediate attention in the direction of our program of protection and reforestation, from which alone permanent relief can be expected.

Pulpwood from Crown Lands

"There has been much discussion regarding the prohibition by the Provinces of Canada of the export of unmanufactured pulpwood cut from Crown lands. There has been too much readiness to argue the topic in public and in the press, where it will never be settled, and too little of amicable conference through properly authorized channels that might lead to a mutually satisfactory conclusion. Your association approved the passage of the Underwood Resolution which provided for the appointment of a commission to take up these matters with Canada, but, while passed by both houses of Congress it failed to receive the President's approval. Whatever may be said as to the spirit in which this resolution was conceived and the object sought to be secured, the fact remains that the great body of American paper manufacturers desire nothing but the fairest kind of reciprocal arrangement with Canada as to the interchange of raw materials needed on either side and which can be spared to some extent at least without actual damage to national interests. Approached in the spirit of both sides all our common economic problems will find a mutually satisfactory solution.

It is of interest in this connection to note suggestions made by Col. Graves, former chief of the United States Forest Service. He doubts 'whether Canada has ever considered or been given an opportunity to consider the economic problem in this country in its broadest aspects, with a view to working out plans with the United States whereby each country would assist the other and both be greatly benefited.' It is probable that the resources of Canada are not sufficient to support indefinitely both the Canadian and the American industry, on the other hand he is 'inclined to believe that the Canadian resources would permit of the export of a larger amount of material than at present, enough to allow a steady flow to our mills of a fixed quantity that they could count on indefinitely.' In the present instance he believes 'that a conference by representatives of the two countries should be held to consider the whole economic problem of both countries with a view of working out a plan of mutual assistance.' He lists certain specific matters which the conference should consider and it is his earnest belief, in which I fully concur, 'that as a result of this conference a measure of relief could be granted by Canada without danger to her future interests.'

Organization of Woodlands Section

"There is great interest manifest in the organization of the Woodlands section of our association which is to be effected this week. There is no doubt of the need of such an active working organization as one factor in our campaign to insure our raw material supply. I urge upon every manufacturer with timber holdings, large or small, the desirability of working with and through this section, thereby giving and receiving all the help possible on the practical everyday problems that confront those who have charge of this vital part of our business.

Taxation

"Any prolonged excess taxation burden placed on the back of business is bound to affect our whole economic structure and to reach right down to the 'high cost of living.' The sooner we can have a fair practical 'peace-time' readjustment of our present system of taxation, the better it will be for our entire population. The present system of taxation discourages the expansion of industry and the creation of new productive effort. It encourages extravagance and waste in industry. It offers no incentive for personal saving and lessens the incentive for investment, thereby promoting personal waste and extravagance. Hurriedly constructed in war time, it is only too obviously not adapted to the very different conditions of the post-war period. The need for radical revision along sound lines is urgent and imperative.

"The most notable contribution to this study is that made by the enlarged Tax Committee of the National Industrial Conference Board, with which our tax committee has been in touch for some time, and the progress of whose study and findings is available to us through our membership in the National Industrial Conference Board. We will present to you today a résumé of the tentative report of this committee and believe it a most pertinent topic for our industry to consider and to which it can contribute its weight of influence in legislation.

"I commend to our members a careful study of the reports issued and to be issued by the National Tax Committee and the critical reviews of the same, all of which can readily be secured through our association. The work that has been done under the auspices of the National Industrial Conference Board in this study of taxation problems is but another demonstration of its great capacity for service to industrial America.

"In this case, as in all its research work, it exemplifies that impartial scientific spirit in which the truth should always be sought in the field of industrial economics and in all those social and economic problems affecting industrial development and social well-being in our country. Such an attitude of fairness and justice, together with the weight of the collective experience and representative character of the board's membership will enlist the proper consideration and co-operation of Governmental authorities when formulating industrial legislation and policies. Our own industry is benefiting with all other industries in this great service. I am glad to report that there has been an appreciable increase in the financial support of the board by the paper industry during the past few months. We are by no means contributing as much as our industry should fairly do and the number of subscribers from the paper industry, some twenty-five in all, should be quadrupled. I know of no activity which I can so confidently recommend.

Income Tax Committee

"I am fully convinced that the work of our Income Tax Committee has been of great financial and educational value to the industry. While the income tax questionnaire seemed at first a burden placed upon us by a too inquisitive Government, it eventually, under the wise direction of your committee, in co-operation with the fair and broad-minded attitude of the Government officials, worked out to the benefit of both the industry and the Government. I am very glad that we have with us today the men who have been most responsible for the successful handling of this one of our important Governmental relations, and they will give us a final résumé and report which will, I am sure, command your deep interest.

Tariff Matters

"More than a year ago, I urged that our industry should prepare itself for whatever might come in the way of tariff changes and urged as one of the activities a careful analysis and study of tariffs, past and present, and an accumulation of information as to the views of individual manufacturers and such other information as might seem necessary to an intelligent consideration of the subject. In the light of the recent election and the possibility of earlier attention to tariff matters by the National Congress, I now renew that suggestion and further suggest that our general Tariff Committee, which is composed of representatives of all branches of the industry, hold a conference in the very near future for the purpose of reconciling any conflicting views that may appear, and map out a plan of procedure which will show a united front when the time comes to present our views to whatever body may have the matter in charge, whether the Tariff Commission or Congressional Committees.

General Business Conditions

"This conference affords a proper opportunity for careful survey and discussion of general business conditions, as well as the specific situation in which our industry finds itself. We all know that no industry can live unto itself alone and while it may temporarily seem to be outside any disturbing influence that affects the country generally, it will eventually be subject to and show the effect of the same economic, financial and psychological conditions.

"We should remember that the general prosperity of the country rests always on the foundation of public security, public order and public satisfaction. We have won public security by the decisive defeat of those nations that threatened it and can now devote our energies undividedly to economic, social and industrial advance. We have now the consciousness that it is in our power to preserve order within our boundaries and enforce our laws and without these we cannot hope to be prosperous. The last fundamental, public satisfaction, may be even harder to achieve.

"While we are thoroughly convinced that American business prosperity cannot be shaken, we should in all honesty welcome a general return among the people at large to a more normal manner of thinking, working and living. With less of individual and corporate extravagance and a resultant increase in thrift; with increased production in all lines; with an ever-increasing degree of understanding between all of the human agencies in industry and commerce; with a larger measure of confidence and feeling of mutual responsibility between management and worker, I can see the development of that feeling of 'public satisfaction' that is one of the greatest factors in public prosperity.

"We are somewhat of a mercurial race and often pay too much attention to superficial conditions, losing sight of the sound and stable substructure which is the ultimate support of our national prosperity. From every point of view that substructure is capable of sustaining all reasonable burdens that our financial, industrial and economic life may at this time lay upon it.

"With bumper crops now being harvested and the universe still demanding our products in quantities such as no country has ever before been asked to supply, we face a golden opportunity. We only need stability of thought and courage in expression, and our future will be greater than that of any nation in commerce and finance the world has ever known.

"We have just gone through a great election. Whatever may have been our individual leaning, the judgment of a great people has been pronounced.

"Let us now address the future under a united policy of peace, friendliness and good will to all peoples and nations of the world in the interchange of ideals and commodities, and, by example, show the virtues and advantages of honest labor, thrift and close attention to the upbuilding of all our economic values upon farms and fields, in forest and in mines, factories and industries, and in our commercial and banking activities; in equal fairness and justice to labor, invested capital and executive service, in a genuine community of interest and unity of efforts; each for all, all for each, all together for the honor and prosperity of 'America, the Land we Love,' and also for the whole world."

And while doing this for the honor and prosperity of America let us not forget that a world that is in economic, political, social and industrial distress turns to us for performance and leadership. Our great service to the world can be rendered only as we set our own house in order and in the spirit of intelligent selfishness as well as good will prepare to lend a hand. By the adoption of such a programme here at home the United States can prepare for and gladly take up the challenge of the world to leadership for to such a call our duty and interest alike respond.

Report of Tax Committee

Following President Sisson's address, reports of the following committees were given:

Tax committee, by Milton E. Marcuse, of the Bedford Pulp and Paper Company:

"As has been stated in the programme the chairman was unavoidably absent in Europe, and could not attend the final meeting of the committee. Therefore, you will have to bear with me while I attempt to give you a feeble report of the great work that is trying to be accomplished by that great body.

"Universal dissatisfaction with the existing tax laws compelled the thought of all thinking citizens of the United States toward suggestions as to proper revision. The first meeting that was held on this subject of national scope was held here on April 20 of last year, at which about a hundred organizations of business interests were represented. It was called by the American Petroleum Institute and the American Mining Congress, under the auspices of the National Industrial Conference Board, and in order to give you some idea of the force of any recommendation that might come from a committee organized by the National Industrial Conference Board, just let me remind you of the national importance of that body. It combines in its membership thirty-nine national business organizations, representatives of 50,000 manufacturers in the United States, employing between eight and ten million men and women, so that when it gives serious thought and study to any subject sufficient to suggest remedial legislation, the force that is behind any suggestion made must be felt.

"In approaching the tax problem, they realized that it was too large a subject for the regular tax committee to give the proper report on. Therefore, they were empowered to enlarge the committee from any source that they decided upon. They did not make the increase to the committee from any territorial or business subdivisions primarily, but to bring into the committee a thought that would be a composite of the entire business world, and while working out a suggestion of the tax solution to bring into force not only equity in revenue but also simplicity to ordinarily paradoxical elements.

"Now they have approached only the revenue end of this proposition. They recognized the principle of retrenchment as one that is a paramount question for consideration, but it is so large a subject that this committee could not give to it the proper study, and it is a subject that should be given the undivided attention of a very competent committee, but they took into consideration a point that has rarely been presented to Congress in the form in which they proposed to present it. It is entirely unselfish, it isn't on the principle that iron and steel can stand taxation better than paper. They have gone at the proposition with the idea that the Government needs so much revenue, and they have suggested a method that up to the present moment seems best to them. I have said up to the present moment advisedly, because the findings are not complete. The subject is liable to changes from different angles, but they will recommend action that will provide ample legislation not only to meet the needs of the Government for the next few years, but will take into consideration the floating and maturing obligations.

"We have raised $5,400,000,000, and the committee has approached the subject with the idea of continuing that amount of revenue from the people. If any retrenchment would reduce the amount necessary that would be met by the same spirit. Now you have read the report of the present Secretary of the Treasury, where he says that the expenses of the Government will be approximately a hundred billion dollars for the next few years. Therefore, it is a heroic task to raise the $5,400,000,000, and it is that spirit of patriotism that pervaded the American people since the great war that will help accomplish this task.

"In June, 1919, we had a debt of approximately $26,500,000,000, which has been reduced about two billion and a half dollars to September 20. In June, 1919, it reached its peak. Of that amount, $3,700,000,000 approximately, was in floating debts in the shape of taxes and treasury certificates. That has been reduced by

income and conversion of supplies about a billion and a half, and the general debt of the country as represented by bonds of $24,000,000,000 has been reduced about a billion dollars. But that leaves a floating debt of two billion and a half, and that floating debt has frequent renewals and incidental annoyances that come up and affect the money markets and affect the financial ends of every business enterprise at every period of renewal. Threfore, it is to avoid the frequent occurrence of renewals that attempt is made to raise as much revenue as the committee has deemed fit to advise.

"On January 1, 1923, we have maturing six hundred billions in war savings stamps, and May, 1923, four billion seven hundred millions in victory notes. It is a herculean task to undertake to refund these amounts, and it would be very much simplified if the floating debt by that time would be removed. That is the task they set out to accomplish. How they approached it is very clearly explained in the tentative report that they made. They had a meeting the 22d of October, at which they had a very large attendance, and which was addressed by the men who have given the subject the most profound though and whose opinions are most highly valued on the subject of economics. After this meeting, the tentative report was submitted to the committee, and they are now filing what may be a final report, but which may not be. They are in meeting this week in New York for that purpose. Therefore, there will be no widespread circulation of the tentative report as there will be of the more completed report. They attacked the subject first to correct the ill-advised, hastily constructed war-time taxation, and to bring into our laws such measures as would more justly and evenly spread the burden of the maintenance of the Government throughout the length and breadth of the land. First of all, there was a crying demand from every section of the country for the reasons set forth so well by the president for the repeal of the excess profits tax. That seems to be so universally recommended by almost every one and by both great parties in Congress, that it is forcing the conclusion that that tax should be changed.

"Now, the excess profits tax produced one billion, three hundred million dollars, and they have to find a way of providing for that loss of revenue. They have recommended first, repeal of the excess profits tax, which they have estimated as compared with the previous years as producing nine hundred millions this year. They recommend a limit of surtax on saved incomes to 20 per cent., so as to encourage the use of savings in enterprise, which will call for a reduction in the present revenue of two hundred and thirty millions.

"They also make a recommendation that the net losses of previous or succeeding years could be and should be used to offset the profits reported which would affect the revenue to the extent of fifty million dollars, making a total net loss estimated at one billion, eighty million dollars.

"There are forty-eight millions from the taxes on transportation that will come to the Government, due to the increased rates recently, so that reduces the next amount to one billion, thirty-four millions.

"I am going to try to get over this as rapidly as possible.

"Now, they have made several suggestions as to administrative changes, among others is the one I incidentally mentioned there, that losses of a previous or immediately succeeding year should be used in compiling the profits of the year reported.

"Other changes that are suggested are that if you sell your property in exchange for other securities, that should not be accessible to taxation. That the capital stock tax should not be the result of two investigations on the part of the Commissioner of Revenue, who would assess the capital stock tax at the same time they assessed the income tax or profit tax. They do suggest that any investigations, inquisitorial investigations at least, be reduced to one.

"Now, to provide for this decreased income, they are suggesting that in lieu of an excess profit tax there should be a profit tax, a flat profit tax on all profits without any exceptions, not even the two thousand dollar exemption now offered to relieve lesser institutions, and that recommendation of 16 per cent. would provide five hundred and fifty millions.

"They suggest the quadrupling of the stamp taxes, the present documentary taxes which would yield a hundred and thirty-four million dollars. They suggest the increase to three cents of the first-class postage stamp, the increase to 10 per cent. on cigarettes and an increase on tobacco that would yield eight millions, an increase on musical instruments to yield seventy million, and on cosmetics, etc., six millions and a half. Here is an entirely new tax, automobiles and trucks, special annual excise tax equivalent to 50 per cent. for each horsepower, one hundred million dollars. Now, these following four are also new suggestions, entirely new forms; Gasoline, one cent on a gallon, which would yield forty-five millions; two cents on a pound of sugar, two hundred millions; coffee, two cents, tea ten cents, which would yield ten millions; making a total of twelve hundred and ninety-three millions, and they have an alternative by increasing the normal tax on incomes, and surtax on income, from forty to fifty millions.

"In these recommendations, they have not recommended the tax that has appealed to every man who has given cursory thought to the subject. Every man that was on that committee went hopefully into that meeting thinking that an entirely new tax could be assessed that would simplify everything and take the burden of taxation entirely off the shoulders of every one per se, by the recommendation of a tax on sales and turnovers. I can say confidently that the committee were practically unanimous in their individual views that that was the proper subject for taxation. They left the subject after many meetings, devoting hours and days of their time to the study, recommending that no sales tax be assessed.

"Now, they were not entirely unanimous on it. I say not entirely unanimous; there were one or two voices in the whole organization that were unwilling to surrender some form of sales tax, but those that had reached their conviction had reached it most firmly, and they had brought into the discussion of the subject such men as Professor Adams, whom you all know, of Yale; Professor Seligman and Professor Hague of Columbia, and Professor Kemmerer of Princeton, Otto Kahn, and such men, who are authorities on the subject of taxation. All of them had good and substantial reasons for not levying such a tax. The tax on sales is being imposed in Canada, also in Germany and France. We ourselves are using it in the Philippines. It has been used in Mexico for a long time. It is not a new form of taxation. It has been used as the dernier resort in every country where it has been used. It has been tried in the various countries in the world from the time of the Egyptians, when we first started to assess taxes. It was used freely in the time of the Romans, and brought up to date through all the countries of the world, even in America after 1776, when we were confronted by the necessity of adequate revenue for war indebtedness. It was given serious consideration and abandoned as unsound and economically unwise. This fact was brought out, that no country has ever adopted it that hasn't abandoned it, and no country has ever adopted it, with the exception of Germany in 1919 and France in 1920, when they have once tried it and abandoned it. It has only been used again in those countries because all other methods of taxation have exhausted themselves.

"Now, Mr. Guyon of Canada, recently made a speech, when he stated that that tax was not only not burdensome, but it was welcomed by the people and certainly by the Government, because it was yielding 20 per cent. more revenue than the Government experts had figured on.

"The experience of Germany and France is entirely too recent for them to express any opinion on the subject, and that of Germany is too little known to form our own opinions on.

"The Canadian law has a list of exemptions that will reach to the ceiling already, and with the authority to add to the list of exemptions whoever they see fit. One of the difficulties of the sales tax is its equality of distribution. Mr. Otto Kahn reached finally the conclusion that he favored some form of sales tax such as on the final distribution; in other words, as the product passed to the manufacturer or consumer or to the final consumer from the retailer. To tax the living wage, which it would practically accomplish, is socially unsound for the reasons that it would reduce the standard of living by increasing the cost of living among those people who spend substantially all they earn for their daily requirements and comforts.

"Therefore, that principle was the basic principle on which it was rejected by the committee, The fact that it could or could not be passed along was another subject, that it would change our methods of business in a sellers' market. You can pass anything along, but when it comes to a buyer's market, would not the burden of it have to be borne by a very small class of part of our population?

"Here was another problem of its inequality of application. The man who made his own field from his own pig iron that he made himself had but one tax in his continuous manufacture from the ore bed to the finished product. Whereas, a man who bought ore or pig-iron or steel, or the different things that went into the manufacture, would have a series of taxes.

"There was another feature objected to, and that was in competition with foreign business, where inequalities would arise again. So the committee, for these and several other reasons which will be presented to you in full in that final report, abandoned the thought of the sales tax as a proper medium of securing revenue. In opposition to them were great organizations like the National Association of Business Men, that was represented by Mr. Rothschild, who had a great meeting in Salt Lake City in the early part of October, and they give good and substantial reasons why they should have such a tax. You know a questionnaire was sent by Winthrop & Company, to which they received 4,300 answers, 70 per cent. or more favorable to a turnover tax. You know that one of the big insurance companies also sent a questionnaire throughout the whole country to the business men and men who have given profound thought to the subject, and they were overwhelmingly in favor of the sales tax. The National Association of Business Men want to raise every dollar of our taxation in that way. The business men's national tax committee is a very large organization. Now, the other side of that thing was, of course, voiced by such men as the president of the Delaware & Hudson, who took the principle that taxing the ability to pay was wrong economically, that you ought to spread the burden of taxation to every citizen of the country, that we should not penalize savings, but expenses, and that enterprise needed to save capital and save earnings of the larger income, and they gave very good reasons.

"I am just trying to give you both sides as they were presented, but I am very certain that the report that will come to you from the industrial conference board will be a recommendation that is bound to have itself felt."

REPORT ON FOREST CONSERVATION

The Committee on Forest Conservation report was presented by Frank L. Moore as follows:

"Since the presentation of its report entitled 'The Next Steps in the Forestry Programme at the annual meeting of the American Paper and Pulp Association, April 15, 1920, your committee has been busily engaged in carrying out the authorization given it, to do all it could upon its own initiative and in co-operation with other agences to secure the legislation outlined in that report, as being fundamental to a national forest policy, which shall eventually provide an adequate timber supply for the people of the United States.

"Your committee is very glad to report its efforts have resulted in a highly gratifying measure of success, and that on October 15 it met in joint conference with representatives of the National Lumber Manufacturers' Association, the National Wholesale Lumber Dealers' Association, the Association of Wood-Using Industries, the American Forestry Association, the American Newspaper Publishers' Association and the United States Chamber of Commerce, at which the entire matter was discussed at length.

"Unanimous agreement was reached on all essentials of a federal legislative programme in accord with our previous reports, and also substantially in accord with the recommendations made last June to the United States Senate by Chief Forester William B. Greeley. Colonel Greeley was at the conference by invitation and gave its conclusions his full approval on behalf of the United States Forest Service. It is expected that this preliminary agreement, through its full consideration of the public welfare, will receive the ratification of all the public and private agencies represented at the conference and also be acceptable to the majority of others interested, including the forestry departments of the several States.

"The primary provisions are two-fold—for a considerable extension of direct federal activity in forest ownership and production, and for the development with federal aid and encouragement of such systematic policies in the several forested States as, being consistent with local conditions, will bring about adequate forest protection and reproduction in the interest of these States and of the public at large.

"Much of the responsibility for forest production lies with the States and private owners. To define that which lies with the Government and hence is properly for the consideration of Congress, the following legislation is proposed:

"1. Authorizing the Secretary of Agriculture, after consulting appropriate local agencies, to approve an adequate policy for each State, covering the essentials of fire protection on timbered and restocking lands, reforestation of denuded lands, and, where and to the extent necessary, the cutting and removing of timber crops so as to promote continuous production of timber on lands chiefly suitable therefor, and authorizing his co-operation in the work required, provided there is also satisfactory local compliance in State legislation or administrative practice. Chief, although not entire emphasis for the time being, is placed on fire prevention, as the most important single step, and not less than a million dollars should be annually available for such co-operation with the States.

"2. A survey to obtain necessary information as to forest resources, forest production and forest requirements of the nation.

"3. Provision for studies and experiments in forest reproduction methods, wood utilization, timber tests, wood preservation, development of by-products and other steps to bring about the most effective use of the nation's forest resources.

"4. Provision for a study of forest taxation, to assist States in devising tax laws which will encourage the conservation and growing of timber. Investigation also of methods of insuring against forest losses by fire.

"5. Provision for more rapid replanting of the vast areas of denuded lands within the national forests.

"6. Appropriation of ten million dollars a year for five years for the purchase of lands which should be added to the National Forest system, whether or not on the headwaters of navigable streams as such purchases are now limited.

"7. Authorizing acquisition of similar lands by exchange of land or timber when clearly in the public interest.

"8. Authorizing the addition to National Forests of lands now

in other forms of government ownership but found chiefly suitable for permanent forest production.

"Some of these features of a complete Federal program will doubtless be covered in whole or in part by recommendations to Congress by the Secretary of Agriculture in connection with the agricultural appropriation bill. It was felt by the conference, however, that they should be presented to Congress in a comprehensive measure, clearly setting forth the picture of an adequate national forest policy and proper Federal participation therein. By this means, with other efforts, the necessary private and state participation can best be shown and obtained.

"The responsibility for the carrying out of a National Forest policy, aside from the administration of government-owned lands, rests upon the State authorities and private owners, since under our form of government the control of corporate and private activities is retained primarily by the States, and is not delegated to the Federal Government.

"In order, therefore, to link up National, State and private activities in an effective programme, it is necessary that the States in which forest land constitutes any considerable factor shall establish essential requirements in protecting timbered and cut-over land from fire, in reforesting denuded lands, and, where and to the extent necessary, in the cutting and removing of timber crops by such methods as will promote continuous production of timber on lands chiefly suitable therefor.

"With due regard for all interests concerned, based upon its own experience and study of the question, together with suggestions received from many prominent foresters, your committee believes that an adequate and effective State forest policy should include the following principles and provisions:

"1. That all soil shall be made productive of the crop to which it is best adapted or for which there is the greatest public need.

"2. That while agriculture and forestry are based upon soil production, the methods necessary in forestry and the time involved are so different from those of agriculture that forestry demands an entirely different form of administration.

"3. That State forest policies shall be initiated and carried out in co-operation with the National Government and with private owners wherever and to the fullest extent possible.

"4. That State forest legislation shall establish general principles and procedure only and vest in a properly constituted and non-poltical body, acting through technically qualified representatives, the responsibility for the fixing of regulations and enforcing them.

"5. That the paramount and immediate consideration in any forest policy is the creation and maintenance of effective means for the prevention and control of fire on all forest lands of whatever ownership, and that every owner of forest land shall be required to conduct operations thereon in such a manner as to avoid creating a fire menace to adjacent property.

"6. That forest surveys, land classification, forest research and forest education shall be provided for.

"7. That there shall be such changes and adjustments in prevailing systems of taxation as will enable all forest land to be equitably taxed thereunder, yet will not discourage the holding of private forest land for future crops without impairing local revenues.

"8. That the State, upon request shall assist the private owner of forest lands to make them continuously productive through the preparation of working plans, supplying of planting material and supervision of silvicultural operations free of charge or at cost.

"9. That the State be empowered to take over at a fair valuation and administer as part of the system of public forests any land, which, after competent examination, is classified as suitable only for timber growth, in case the owner refuses to avail himself of the opportunities and assistance provided by the public to encourage forestry upon private lands.

"10. That the acquisition of forest land by the State is essential to a sound forest policy.

"11. That all State-owner forests shall be utilized for continuous production, both for direct returns in forest products and indirect returns in soil protection, game and recreation.

"12. That all State-owned forest property shall be capitalized upon the records of the administrative body so that all expenses in connection with the development thereof and returns therefrom may be accounted for on a business basis to the people of the State who furnish the funds for the undertaking and enjoy its results.

"Your committee submits the foregoing as the result of its work during the past six months and recommends that if the views here set forth meet with the approval of the members of the American Paper & Pulp Association the committee be authorized to proceed further in its efforts to bring about the enactment of National and State legislation of the character suggested."

REPORT ON INCOME TAX QUESTIONNAIRE

The report of the Income Tax Questionnaire Committee was given by Frank H. Macpherson, of the Detroit Sulphite Pulp and Paper Company, who said:

"It has been deemed due to the paper industry that a final report should be made touching upon the work that has been done since the date of the Income Tax Questionnaire Committee's last report, presented at the annual meeting of the association in New York, April 13, 1920; likewise, that a short historical statement should be prepared and submitted to the industry setting forth briefly the various steps taken by the committee through its entire work, to protect the interests of the industry generally.

"For the benefit of a comparative few who have suggested that possibly if this committee had not been so 'aggressive' or had not gone so far in its efforts to collaborate with the Bureau of Internal Revenue (Natural Resources Subdivision) that the industry might have been spared the time and expense which the preparation of the answers to the questionnaire have required, it is thought well at this point to state again, briefly, some outstanding facts concerning the attitude of the committee in the earlier stages of its existence. These facts have all been stated in previous reports, and have probably been overlooked by the few who have expressed these views. The facts are:

"1. That the Treasury Department (Income Tax Section) came to the American Paper and Pulp Association in the first instance and indicated its intention of sending out a questionnaire and sought assistance.

"2. That such draft questionnaire was submitted to the committee by a representative of the Treasury Department the day following its appointment.

"3. That the committee was unable to satisfy itself that there was any real necessity for such questionnaire, and it accordingly prepared a brief in opposition to the idea, which brief was by a sub-committee presented to the proper officials at Washington, and which brief set forth the opinion that the making up of the answers to such questionnaire would prove exceedingly burdensome and expensive to the industry.

"4. That much of the information requested through the questionnaire as submitted was not germane to the expressed primary purpose of the document as understood by the committee.

"5. That the pulp and paper industry should not be singled out and put to an expense of this sort, unless it were the intention to require like returns from all other industries.

"6. That the members of the committee had not been able to establish in their own minds that such real necessity for the

proposed questionnaire existed as would warrant the expenditure of time and money required to carry it to its final conclusion.

"The Treasury Department representatives made very plain to the sub-committee which attended at Washington that a questionnaire was conceived to be necessary, and would be sent out in any event; that in order to properly audit the accounts of the years 1912 to 1919, and subsequent years, certain information not in the possession of the Income Tax Division had to be obtained.

"Under these circumstances, the committee felt in duty bound to acquiesce to the fullest extent in the request of the Treasury Department, that the industry should collaborate with it in order that a questionnaire might be prepared as simple in form as possible, and yet one which would furnish to the greatest extent possible the information needed for use by the Income Tax Division.

"As a result of such collaboration, the committee succeeded in having stricken from the questionnaire all questions relating to (a) cost of inventories, (b) operating costs, (c) that "associated business" should not be included in the list of producers, asked to fill out the questionnaire, and (d) in very materially simplifying the questionnaire as finally submitted, as compared to the original draft.

"The eliminaion of the items 'a' and 'b' from the questionnaire meant an actual saving to the industry, in time and expense, of hundreds of thousands of dollars, while the relieving of 'associated business' (which means waxing plants, paper box-making plants, food and other container plants, carton manufacturers, tag manufacturers, paper bag manufacturers, paper towel and napkin manufacturers, envelope and papeterie manufacturers, paper dish manufacturers, tissue converters, toilet paper converters, furniture manufactuers (using paper), and the many other industries using paper as a basic product of manufacture, of the filling in of the questionnaire. While this latter was perhaps not a direct benefit to the producers of paper, it was, nevertheless, a very valuable service rendered to their many customers.

"Following the issuance of the questionnaire (form T. P.), and of the report of the 'Income Tax Questionnaire Committee' in April, 1920, regional conferences were arranged for at various points centrally located, for discussion of the questionnaire, and of the primer, which had been prepared and sent out with the April report of the committee. Meetings were held at the following points and dates: Cleveland, Ohio, May 17-18; Middletown, Ohio, May 20-21; Kalamazoo, Mich., May 24-25; Appleton, Wis., May 27-28; Philadelphia Pa., June 1-2; Springfield, Mass., June 3-4; Watertown, N. Y., June 7-8; Portland, Me., June 10-11.

"The Bureau of Internal Revenue was represented at all of these meetings with the exception of the last, by the late Henry E. Surface, valuation engineer. The industry was represented at the Middletown, Kalamazoo and Appleton conferences by F. H. MacPherson, chairman of the committee; and at Philadelphia, Springfield, Watertown and Portland, by H. R. Weaver. These conferences were, for the most part, well attended by executives, accountants and auditors of the manufacturers in their respective localities. Very great interest was shown and innumerable questions were asked and answered to the best ability of the Government representative and the representatives of the industry. These meetings were a distinct value in setting at rest any feeling as to the necessity, or otherwise, of filling in the questionnaire which theretofore may have existed in the minds of some members of the industry.

"At this point we should pause for a moment to record the great loss which came to the Bureau of Internal Revenue, and likewise to the paper industry, in the death of Henry E. Surface, valuation engineer, of the Income Tax Section of the bureau. Mr. Surface had attended the conference at Watertown, N. Y., on June 7 and 8, and was on his way to Portland, Maine, on the night of June 8, as a passenger on one of the ill-fated trains which were in the accident on the New York Central at Schenectady, N. Y., on that night. The members of the Income Tax Questionnaire Committee who had come most in contact with the late Mr. Surface had formed a very high opinion of his ability, and of his fair-mindedness—he was willing to be shown and to change his views to accord with the opinions of others when he had satisfied himself as to the reasonableness of the position taken by those others. We all regret very much his untimely passing.

"Advice has recently been received from the office of the Commissioner of Internal Revenue that a successor to the late Mr. Surface has been named in Walter Robertson, of New York. We are advised that he has had many years' experience in designing, constructing and reconstructing pulp and paper plants; he has appraised mills, including water powers, etc. His experience has, it is stated, been a decidedly broad one in this field, and the officers of the Bureau of Internal Revenue believe he will be of great value in handling the work which is before him.

"We are informed that blank questionnaires were mailed to 956 taxpayers and that up to November 1, 281 completed questionnaires had been returned; that extensions of time were granted rather liberally, and largely because the death of Mr. Surface made it necessary to postpone consideration of the questionnaires.

"Following the sending out of the questionnaire in May last, it developed that the Eastern Paper Board Manufacturers Association, or some of its members, felt that the questionnaire was not properly applicable to the paper board mills, and request was made of the Bureau of Internal Revenue that such mills should be exempted from filling out the Form T-P. A conference was held in Washington, D. C., on July 21, when the objections of the paper board mills, or some of them, were set forth. The Government position was made plain to the protestants and its reasons given for including the box board mills in the inquiry. After some discussion, the officers representing the Income Tax Department expressed willingness to permit the protestants to formulate its own questionnaire, acting with some qualified member or members of the Treasury staff. Just how far this work has proceeded your committee is not advised. Since the box board mills comprise a very large percentage of the taxpayers to whom Form T-P was sent, this will further account for the large number of unanswered questionnaires."

The various reports were further discussed by H. R. Weaver, of the International Paper Company; Carl B. Stevens, of the Federal Income Tax Bureau of Chicago; R. S. Kellog, of the News Print Service Bureau, and R. G. Elliott, of the National Credit Men's Association.

In Memory of War Heroes

A solemn moment interrupted the morning session, when at exactly 11 o'clock, while the city's whistles were blowing and the church bells ringing, President Sisson halted the proceedings and requested all to stand and face the east, as a reverent tribute to the memory of those who had paid the supreme sacrifice that the world might be free.

Suspends Schedules on Chip Board

[FROM OUR REGULAR CORRESPONDENT.]

WASHINGTON, D. C., November 10, 1920.—The Interstate Commerce Commission has suspended from November 29 to March 29, 1921, the operation of certain schedules appearing in Agent E. B. Boyd's I. C. C. tariff No. A-1130.

The suspended schedules provide for changes in commodity descriptions of chip-board and strawboard resulting in increased commodity rates on those commodities in straight or mixed carloads between St. Louis and points in Illinois and points in Michigan and Wisconsin.

LUNCHEON IN GOLD ROOM OF CONGRESS HOTEL

The luncheon, in which jointed the members of the National Paper Trade Association, was held in the Gold Room of the Congress Hotel and established another record for attendance, as being the largest in the forty-three years' history of the association. Seated at the head table were:

Lewis C. Anderson, vice-president, W. G. Oglesby Paper Company; George W. Olmsted, Butler Paper Company; Louis Bloch, vice-president and general manager, Crown Willamette Paper Company, member at large of executive committee, A. P. & P. A.; C. N. Bicknell, Union Paper and Twine Company, vice-president, National Paper Trade Association; W. J. Raybold, vice-president and treasurer, B. D. Rising Paper Company, executive committee, American Paper and Pulp Association; S. M. Felton president, Chicago Great Western Railroad; A. H. Nevius, vice-president and general manager, Miami Paper Company, Western vice-president, American Paper and Pulp Association; David R. Forgan, president, National City Bank of Chicago; George W. Sisson, Jr., president, Racquette River Paper Company, president, American Paper and Pulp Association; Ross P. Andrews, president and general manager, R. P. Andrews Paper Company, president, National Paper Trade Association; Henry W. Stokes, president, York Haven Paper Company; A. B. Daniels, president, L. L. Brown Paper Company, ex-president, American Paper and Puly Association; Ed. F. Herrlinger, Herrlinger & Company, vice-president, National Paper Trade Association; Frank L. Moore, president, Newton Falls Paper Company, ex-president, American Paper and Pulp Association; O. A. Miller, president, Central Paper Company, ex-president, National Paper Trade Association; L. M. Alexander, president, Nekossa Edward Paper Company; F. L. Stevens, president, Stevens and Thompson Paper Company, Eastern vice-president, American Paper and Pulp Association.

President Sisson Opens Speaking

After full justice had been given to an excellent menu, President Sisson, as toastmaster, opened the speaking programme saying:

"I count this a most auspicious occasion. I have felt elated heretofore on certain occasions in gatherings of this kind in the paper industry, but never in my recollection, and I think not in the recollection of that honored, oldest member of our body, Mr. Whiting (applause) have we seen in the forty-three years of the existence of this association such an occasion as this where, without the usual paraphernalia of a social banquet, we can see 500 earnest, thoughtful men from all branches of the industry gathered together to consider carefully, calmly and sanely the conditions in their own business as well as those in the country and world at large. So I want to congratulate our industry that we have arrived in our organizations, that we have arrived in our attitude of mind to that point where we can see the necessity, the advisability and the real effect in our service to the country of getting together and comparing notes as we are doing here on this occasion today.

"We are meeting also upon a memorial day, a day which has recollections to us of joy as well as sadness, a day which inspires us to attempt in our readjustment problems in times of peace an attitude that we think perhaps was not fully taken advantage of when that first armistice day occurred two years ago.

"We are facing readjustment problems in this industry and in all industries, but we are facing those problems with open eyes and unafraid. Unafraid, why? Because we are meeting those problems with full knowledge of the conditions in our own industry as well as conditions in the country at large. We are going to reap in this readjustment the benefit of the knowledge we have gained by the work we have been doing in the various branches of the paper industry, both in the manufacturing and in the merchandising end, and I want to congratulate the American Paper and Pulp Association, and I want to congratulate, Mr. President, the National Paper Trade Association for the fact that they are all working on sound, economic lines and intend to so guide their business as those lines and their findings will recommend to do.

"We must challenge our emotions with our intellect, gentlemen, in any problem that comes before us. That will bear repetition—we must challenge our fears with definite knowledge of the situations that come before us, and any one in his attitude toward national affairs or in his attitude toward his own business is actuated by mere impulse or emotion has not arrived at that position where I believe the paper industry has arrived in America.

"We are in a sound position; we are not overextended in this industry financially; we are not overtaxed so far as inventories of stocks are concerned. We have escaped some of the detrimental influence that have affected other industries, and I can see nothing, with wise action on our part, to halt or to hinder the onward march of success and prosperity in this industry.

"That is my thought and my message to you today, and it is based on the sound study of economics which has been your work during the past particularly three or four years.

"In considering these things, our thoughts go at once to the financial necessities of all business. We must turn to the banker from time to time, and he has his proper place in all those things that have to do with modern business. We are interested to know what the leading bankers of this country think of the present situation, not only domestic but international, and it is indeed fortunate that we have with us today a man who by his standing in the banking community, by his experience and knowledge, is well fitted to address us on the matter of 'Business Conditions and the Paper Manufacturer,' and I have great pleasure in presenting to you David R. Forgan, president of the National City Bank of Chicago."

Mr. Forgan proved an interesting speaker and held the close attention of his audience during his analysis of the business situation.

Others who spoke interestingly on the subjects assigned to them were President S. M. Felton of the Chicago Great Western Railroad, on "Manufacturers and Transportation"; H. A. Ley, president of the Life Extension Institution of New York, on "A Worthwhile Industrial Activity," and Dr. Hollis Godfrey, president of the Drexel Institute, on "Forestry Conservation."

Connecticut Cost Association Meets

[FROM OUR REGULAR CORRESPONDENT.]

HOLYOKE, Mass., November 15, 1920.—The Connecticut Valley Branch of the Cost Association of the Paper Industry held its November meeting last Monday evening at the Hotel Nonotuck, preceded by a banquet. John A. Reilly, head of the Cost Department of the American Writing Paper Company and president of the association, presided and covers were laid for about 60.

Cost men from most of the paper mills of the valley and several of the paper converting firms attended. The paper of the evening was by Walter M. Kidder of New York City of the W. M. Kidder Company, cost and production engineers. Most of the papers of previous sessions had been of interest to the paper manufacturers alone, but Mr. Kidder's paper was a general one on the value of cost work and equally valuable to the paper converters. A lively discussion followed the paper and many questions were asked of Mr. Kidder.

WOODLANDS SECTION OF A. P. & P. A. FORMED

On Friday what might be considered the big feature of the week's conference, the organizing of the Woodlands Section of the American Paper and Pulp Association, took place.

The large attendence and the interest in the various papers read is a strong indication that this branch of the association will prove invaluable in the future development of the industry. Each paper read showed the intelligent investigation its author had made of his subject. Following are the papers read:

At the close of the meeting, a committee on organization, appointed by Mr. Kellogg, who acted as temporary chairman, presented the following names as members of the executive committee: D. A. Crocker, chairman; C. W. Hurtubis, vice-chairman; O. M. Porter, secretary-treasurer; R. J. Patrick and R. S. Kellogg. The men were unanimously elected. The executive committee will begin its functions at once, and among other things will prepare a permanent set of articles, to define the purpose, scope and character of the section. Also, the committee will arrange the place for the next meeting. In the near future a joint meeting is to be held with the Woodlands Section of the Canadian Pulp and Paper Association, at some place "where true Canadian hospitality may be experienced by the United States visitors."

Canadian forest interests were well represented at the organization meeting.

COSTS IN WOODS OPERATIONS

D. A. Crocker, of the Eastern Mfg. Co., Bangor, Me.

This paper has been announced in our programme as covering the subject of "Costs in Woods Operations." I would like to add to that title the words, "From the Manager's Point of View," for it is wholly from that point of view that I shall approach my subject. I am not an expert cost accountant and hold no brief for any particular system. I do know what I consider essential records and in discussing these records will perhaps lay more or less emphasis on the methods used in our own organization, not because I consider them perfect, but because they are the ones with which I am familiar. Perhaps another way of stating my subject would be as "Essential Cost Records for Woods Operations."

Cost Accounting Highly Developed

In the pulp and paper industry as a whole I imagine that cost accounting methods have been as highly developed as in any line of business, and the fact that we have a cost Section of this association shows how important the leaders of the industry consider the subject. In spite of this fact, it has been my experience that the woods departments of the various companies, at least in my own locality, are to a large extent following cost keeping methods which, although they give a good picture in dollars and cents of what has happened, do not enable the manager to follow closely the progress of his operations during the season.

Due to a Combination of Reasons

This is probably due to a combination of reasons:

(1) The seasonal nature of our operations in the Northeastern part of the United States has made many operators believe that they could not get cost figures in time for them to be of any current benefit. This is perhaps one reason that the Southern and Western lumber operators are, as a rule, ahead of the northeastern operators in this respect.

(2) The influence of climatic variations such as a heavy rain or snow storm or an unusually mild winter is so great as to make anything but very general averages seem valueless to some woods operators.

(3) Added to the above we have the prejudice of the practical man of the general type of our woods superintendents and foremen against any innovations. This is particularly true of innovations which to their mind do not produce pulpwood. The manager of a woods department has, therefore, had to overcome a considerable inertia before he could successfully install the cost records essential today.

What is the essential information for the manager of the woods operations. Boiled down into a few words it is the current cost of his operations. In order, however, to get this information he must know what his supplies cost, not only at the point of purchase but when actually consumed. He must know what it costs to hire men and transport them to the camps. He must know what these men actually produce and what it costs to board them. He must know the proper charges per unit of time or production to make for horses and machinery, and the amount of his camp construction cost to be charged into the particular year's operations. These are only a few of the things which it is necessary for him to know in order that he may follow with some degree of accuracy the current cost of the operations, and in order to do this he must have some good accounting system, and some good men to run it.

How Results Are Obtained

I have tried to give some little idea of the current information which I think a woods manager should have. In order to explain one way of getting these results, I am going to tell a little about the system in use in our operations.

Like the old time operators we start our season's account for an operation with an inventory of supplies and equipment left over from the previous year. In our country this inventory is taken on or about April 1 and we put the best men in our woods clerical force on to this. It is the final check on the past season's costs and the base for all the next season's costs, and is of the greatest importance. The addition to the April 1 inventory account of all supplies and equipment purchased during the year and the subtraction from this total of the inventory amount of the next April 1 inventory shows the total amount of supplies and equipment used in a given season's operation.

Today the woods manager wants to know exactly what each camp is doing, not only as a whole but also in the various items of work. We get this result in our own system by carrying a sort of supplementary ledger which we know as a distribution ledger. All work in the woods is classified and symbolized. On our payrolls, supply reports, etc., that come in from the woods, all charges and credits are made to the various classes of work at the various camps, and entered in our distribution ledger under the proper account.

Our control account shows a certain operation has cost two hundred thousand dollars. The distribution ledger shows how the two hundred thousand dollars was expended. The distribution ledger shows the cost per cord of camps and other buildings, cost per cord of general expense, cost per cord of pulpwood cut, peeled and fitted, in the long log, cost per cord of pulpwood cut, peeled, fitted, sawed, swamped and piled at the stump, and the cost per cord of wood manufactured in a dozen different ways, showing separately the cost per cord of wood cut by monthly men and

wood cut by cord cutters, not only when the operation is completed, but at the end of each week or month.

Now we go one step farther. We not only know the cost per cord of the operation as a whole, but we know the cost per cord at each camp in the operation.

Arriving at Cost of Meals

We keep the cost of cord cutters' wood. We pay them a fixed price per cord for cutting and charge them a fixed amount per day for board, but we are obliged to charge the same price for board as charged by other operators, and we feel that this rate of board is frequently established by some operator who does not know the actual cost of men's board. In arriving at our cost of meals we include:

First, cost of supplies plus freight delivered at the nearest railroad point.

Second, cost of toting supplies to the camp.

Third, cost of handling supplies through storehouses; this charge also includes fire insurance.

Fourth, cooks' and cookees' meals as well as their labor. There are two items we have not as yet included in our cost of meals that should be. They are, firewood used in cook room when it is hauled and manufactured by some person other than the cookee and the depreciation on cooking utensils, including cookstoves.

We have a sheet in our distribution ledger that shows us the total loss or gain on meals served to cord cutters at the end of each month. This account is charged with the number of cord cutters' meals at the actual cost from our meal reports and this same account is given credit for the amount we receive for meals from cord cutters. This amount is posted from our pay-rolls at the end of each month, and shows us the loss or gain per meal. Sometimes the loss on cord cutters' meals will increase the cost of cord cutters' wood from ten to twenty cents per cord.

Distribution Ledger

The distribution ledger is a loose leaf ledger each sheet representing some class of work in some particular camp. For instance, we start building a camp, a name and symbol is given the camp. We head a sheet with this name and symbol, insert it in our distribution ledger, and as our reports are received from our operation, the charges are posted to this sheet. These charges are made up of man and horse labor from man and horse pay-rolls. Man meals from cook room meals reports, horse meals from hovel meal reports and material and supplies from our monthly supply reports. When the camp is completed the last item we have is a credit to the camp for material such as roofing left over and returned and tools used in building the camp are returned at their actual value, not at the price they were charged to the camp. By treating the charges and credit in this manner, the depreciation on the tools goes into the cost of the camp. When the last posting has been made, this sheet in our distribution ledger shows us the total cost of the camp.

Divided Into Eight Classes

Our inventory of supplies and equipment is divided into eight classes, viz.: Camp supplies, hovel supplies, miscellaneous supplies, veterinary supplies, furnishings, wangun, tools and equipment and live stock. The following will give a general idea of the classification, although including only a few of the items in each instance:

Camp supplies consist of all eatables going to the cook room.

Hovel supplies consist of grain, hay, etc., going to the hovel.

Miscellaneous supplies consist of horse shoes, nails, roofing, lumber, etc.

Veterinary supplies consist of horse medicines and instruments.

Furnishings consist of spreads, dishes, stoves, etc.

Wangun consists of clothing and tobacco, etc., sold to our men.

Tools and equipment consist of axes, spuds, saws, wagons, sleds, chains, saw machines, etc.

Live stock consists of cows, hogs, hens and beef cattle.

If all of these classes of supplies were treated as one, after we had figured the cost per cord of an operation it would not mean as much to us since we would have supplies, tools, equipment and any money we may have made on wangun sold to men, all included in one figure. With our classification we can, at a glance, put our finger on any hole. Then we go into the hole, make an analysis of this particular account and show why the cost is high, and can compare with other camps and other years' records. One camp may show tools and equipment costing 25 cents per cord more than another camp, both camps having cut practically the same amount of wood. In such a case we analyze the accounts at both camps and find the reason for the extra cost. An analysis can be made of any of our accounts in a short time, and after we make this analysis, we really use it to plug the hole.

The Cost of Costs

I imagine that a question may arise in the minds of some of you as to the cost of costs. I know of no way in which it can be absolutely settled, but I think that if you will follow me a minute, you will agree that the extra labor employed is not excessive.

For an operation of from 20 to 40 thousand cords, you have to have the following men:

At each camp a camp clerk and sealer.

At each storehouse a storehouse man.

A paymaster for each operation.

A chief scaler for each operation.

A chief clerk for each operation.

How many of these men are you going to get along without in any event? Possibly the paymaster and three out of six of your scalers. If you don't have a scaler on the job at every camp all the time you are in continual hot water with the piece workers and the scaler is very liable to make errors. We found that regardless of the current production records for costs it was found necessary to have a scaler at each camp to keep our crews satisfied. If there he might as well work all day as part of the time. The camp clerk you must have in any event, and it simply means that he works 60 per cent of the time he would in any ordinary office, rather than about 30 per cent. The paymaster is really a combination bookkeeper, paymaster and assistant head clerk. He would be unnecessary with less detail to handle, but we believe the investment in his salary to be well worth while.

The storehouse men we have at each of our storehouses are essential if we are to know how many supplies we have on hand at any time. They are proving their value particularly this season when supplies are dropping in cost, and we want to carry as small an inventory as possible, and yet keep our camps supplied with everything necessary. Probably the same number of men would be needed in any case, but we could get along with cheaper ones if we did not demand an accurately kept stock ledger and a correct record of receipts and shipments.

Concrete Advantages

Some of the concrete advantages of a good cost accounting system are in the writer's mind as follows:

You get a sure and constant check on the performance of your superintendent and foremen and, most important of all, start them estimating costs intelligently. If the manager tells the superintendent that his wood is costing too much at a camp, but does not back up his statement with figures the superintendent probably thinks the manager doesn't know what he is talking about. If, however, the manager can show the superintendent through cost figures that some item of his expense seems excessive, the superintendent, if of the right type, can be gotten to use the pencil himself and in such a case will either have to acknowledge his mistake or prove the manager wrong. In either case the desired result has been obtained.

Our system makes the clerks keep their records accurately be-

cause they know that errors are caught within a week or two instead of at the end of the season. It helps them to keep track of their supplies so that we do not order too much or too little of any item.

Our purchasing agent would be lost without his reports from the clerks as to quantities on hand, probable consumption over any given period, and records of past years' consumption per cord and per day, month or year to check the clerks' estimates.

The treasurer of the company must make up a budget of his cash requirements not only for a month or two in advance, but sometimes for two or three years in advance. How is he to do this accurately if he has not a good accounting system to fall back on? If we are cutting peeled wood we will want more money in the summer and he must know how much it should take per cord. If cutting only rough wood, another set of conditions arises. In recent times it has been necessary, because of unusual fluctuations in wages to have even better basic information than in the past.

We want to make a price with a contractor. How are we to arrive at a figure which will be fair to him and not be excessive for us? Is his camp built or must he build one? How far is his wood from the landing? What is the stand per acre? What allowance will be made to him if wages increase during the season? You want to give him a fair trade, but how are you to know what is a fair trade if you have no good records?

In what I have said to point this I have dealt particularly with the clerical end of the organization. Tied into this must be the work of your forester or forest engineer if you are to reap the full benefit of your system. He is the man who can give you the amounts to be cut from any suggested camp location, and can frequently locate the camps as well as the superintendent. He can estimate for you the mileage of roads to be built, the cost of dams and other stream improvements and the many other things that requires engineering experience.

Without him you lose much of the benefit of the information your cost department gives you and close cooperation between the forester, accountant and woods superintendent will yield the best results of all.

WHY A WOODLANDS SECTION

By A. L. Dawe, Canadian Pulp and Paper Association.

May I say at the outset that my knowledge of the woodlands problems is purely a superficial one through my connection with the Woodlands Section in a secretarial way, and what I may say is what I have gathered from them.

In 1916, at one of our annual meetings, Carl Riordon, vice-president of the Riordon Company, and who has always been a leader in our industry, proposed the following resolution:

> "Resolved, That there should be promoted a new section in this association somewhat similar to the Technical Section to deal with the whole question of the production of wood for the making of pulp and paper."

On account of differences it was not found possible to organize that section until late in the fall of 1917, at which time a meeting was held in Montreal at which nearly all of the larger companies were represented.

At this time Mr. Riordon outlined his views in bringing these men together.

At that meeting were two of the gentlemen who are here, Mr. Recknagel and Mr. Wilson.

Mr. Wilson gave his opinion on the necessity of the section in these words:

> "The cost of cutting is increasing. Lumbering operations now are back so far that the hauls are very long. We are using the same methods that were employed 25 and 50 years ago, and new machines, such as gasoline log haulers, cutting machines, etc., have not been introduced as they should have been if the ingenuity used in the mills had been applied to the woods end."

That bears out the statement that Mr. Kellogg just made. Mr. Wilson also said at that time:

> "We must use the material we have to the best advantage. This involves the lumbering and utilization of the wood that will not float. The forest is reverting to hardwoods where ever they will grow which will absolutely shut out and prevent the growth of a future supply of conifers unless we find means of getting the hardwoods out and using them so as to give the conifers a chance."

Legislation, Publicity and Education

Mr. Recknagel at that time gave us a talk and outlined what he has to contend with in his connection with the Empire State Forest Products Association; how they found it necessary in the first place to make an inventory of the lands owned by their members; how it was necessary to make an inventory of developments showing the character of improvements, the annual consumption in raw material, the output of finished product, the number of men employed, water power developed and similar data. Mr. Recknagel stated at that time that the most pressing problem in the Adirondacks was the utilization of hard woods and that they had inaugurated a hard wood utilization study that is aiming to bring together suggestions for improvement in utilization and a study of wider markets for hard woods.

Another topic on which Mr. Recknagel spoke at some length was the subject of legislation, publicity and education. To use his words:

> "Nine-tenths of the problem is to educate the public to a realization that lumbermen are not vandals, thieves, and pirates, but a necessary part of the economic machine. The old saying 'Woodman spare that tree' must give place to 'Woodman use that tree' and that the public must learn that forests do not improve by disuse any more than a man's muscles grow stronger in idleness."

We have tried to keep all those sayings before us in carrying out the work of our Woodlands Section, because at the time we realized they were spoken by men who knew what they were talking about.

Excellent Results Obtained

Following this meeting we held our first general meeting in February of 1918, at which some very excellent papers were read by some of the woodland managers and some of the foresters connected with the companies of our association. We tried at that time to make the discussions general, because, gentlemen, you know that woodland managers are men who are used to doing things and not talking about them, and, consequently, at our meetings we found it always advisable to make them informal in character.

Papers were also read on the use of tractors and other machinery and it was felt that the first meeting was a very good start.

We held another meeting in the fall of the same year which was much more widely attended and at which time the question of cooperation with the Government on investigations into destruction of trees by insects and fungus was taken up and the work of the Canadian Commission of Conservation was also discussed thoroughly. We appointed at that time special committees to look

into the matter of the utilization of hard woods and standing committees on improvements and logging methods.

We held in the fall of 1919 what we considered the best meeting we have held and that was held in the nurseries of the Quebec Government, and it was widely attended by the Government officials and Government foresters and woodsmen from all over the country. We also at that time paid visits to some of the private nurseries, including those of the Laurentide Company.

Splendid Reports

That was followed by the Fourth Annual Meeting at the beginning of this year at which our committees on improvement conditions made very splendid reports. A series of very interesting papers, including one on the use of hydroplanes in protecting and surveying forests were read.

In order to hold our members together we found it advisable to draw up a set of by-laws. I have a copy of them here and I might read some of the most important points.

"The objects of the section shall be to stimulate interest in more economical and efficient methods of production and utilization of raw materials for pulp, paper and lumber industries; and to provide means for the interchange of ideas amongst its members, and to encourage investigations of woodlands problems."

That is the object of the section.

Membership

We divided the membership into two classes: Members entitled to vote, and associate members who are not entitled to vote.

The qualifications for membership are:

"Any person who occupies or has occupied an executive woodlands position in the pulp, paper and lumber industry; anyone occupying a subordinate position in the pulp and paper industry who has had a satisfactory technical education; anyone who, though not having had a technical education, has special qualifications and experience."

You will see the qualifications are quite broad.

The qualifications for associate members are:

"Any person who will support and assist the aims of the Woodlands Section, and who, by virtue of his qualifications, is likely to further the work of the section. These members may attend all official meetings of the section and have the right to take part in discussion."

The Matter of Dues

Then we come to the matters of dues. We made our fees quite nominal, only three dollars a year, more to stimulate interest among the woodsmen at the present time. Most of the expenses of the section is borne by the parent association.

We have now some thirty-five members representing the larger companies; in fact, six members represent an area of 27,000 square miles, so while we are not large in numbers we are very large in area.

The officers of the council consist of a chairman and a vice-chairman which are elected each year; a secretary-treasurer, who shall be the regular secretary of the association; three councillors who are to serve for one year, at the end of which time they are re-elected as follows: One to retire at the end of one year, one to retire at the end of two years, one to retire at the end of three years, and thereafter one to retire every year, and one to be elected in his place to serve for three years. The value of that is to preserve some continuity in the business.

We are supposed to hold two meetings annually; additional meetings may be had on the call of the council.

We have difficulties in our Woodlands Section the same as in our Technical Section. The man running the mills sometimes suspects the technical man is after his job and doesn't always have confidence in him. We have in our Technical Section now 150 members and I think we have representatives in every mill in Canada. At the present time I feel that there is great confidence between the men in the mill and the technical men. I think the time has come when the mill men realize he has got something which can help them along.

In connection with the Woodlands Section we have the woods manager, who is a man wealthy in experience, and we have the forester, who comes from college full of theory but without experience, and our aim is to bring about a common platform in which these two types can meet together and use their knowledge and theory to mutual advantage.

Should Cooperate with Canada

Our problems in Canada are about the same as in the United States. I think it is highly desirable that we should try and work together just as much as possible in our technical sections.

In our Technical Section we have been very happy in having the entire cooperation of American organizations. This cooperation has enabled us to bring out what will eventually be one of the most complete text books of any industry that has yet been published, and I feel it is going to be of help to the industry.

Mr. White, our general chairman, asked me to extend a very cordial invitation to any American members who would care to attend future meetings of our Woodlands Section.

FUTURE DEVELOPMENT IN PULPWOOD OPERATIONS

By Ellwood Wilson, Grand 'Mere, Quebec, Canada

The question that I am supposed to speak about today is so big that it is very hard to know what to say and what to leave out.

In regard to what Mr. Kellogg has just said, a very interesting fundamental proposition comes up and that is the conflict between the so-called practical man and the theoretical man.

Practical Man and Theoretical Man

Now there are two differences which distinguish these classes of men. In one case you have a man who has gotten everything that he knows practically by experience. In the other case you have a man who has had put into his head all the experience that it is possible to have obtained on the subject in a general way.

It depends very greatly on the personality of these two classes of men just how they function, but other things being equal, the theoretical man can obtain rapidly the experience which the practical man already has, and not only that, when he is face to face with new conditions and new circumstances, he is able to replace himself and utilize his knowledge better than the man of practical training.

The schooled practical man, when he faces a new set of conditions which are not covered by his experience, very often in attempting to utilize his experience falls down on the problem placed before him.

Fundamentally, there is not a difference between these two classes of men that we are often led to believe; they are much closer together than you would gather from many discussions which we have heard, but in discussing this while question of the future development of logging operations, I want to say a little bit about the fundamental principles. In my experience, the only way to tackle any problem is to get rid of all the non-essential features and get right down to bedrock, get right down to the essentials of the problems and then you are able to discuss it in-

telligently and in a way which is much more practical and much better than you could do otherwise.

More or Less Psychological

This whole question of the improvement of logging operations is more or less a psychological question, that is, it is a question of men's minds and men's way of thinking about things rather than any practical question of method or operations.

For instance, the men who have been operating in the woods in the past are men who have, to a great extent, grown up in the woods and they have been more or less supposed to have some sort of occult faculty, some sort of super sense which particularly fitted them for the work in the woods. In my experience, that has not proved to be true, and the time has come when the operations in the woods must be placed on the same basis as operations in the mill. Nobody would think today of running a big paper mill without trained chemists, without trained engineers, without trained cost accountants, etc., but up to this time we have not had his class of men in the woods. We are only just beginning to realize that logging, after all, is a branch of engineering, that it requires a certain amount of technical education, a certain amount of technical training without which nobody today can be a successful logging operator. We have got to realize that fact, and with all due honor to the men who have blazed the trail in the past, who have gotten out our logs and who have kept our mills supplied with raw material, the day has come when we must change our methods and get more men with technical training in the woods.

In the past the question has been to get out raw material at the lowest cost possible, regardless of anything else. The managers of the mills have said, "We want so many thousand cords of wood a year," and if logging costs went up the least little bit, there was immediately a holler and the man responsible for getting the material, the timber out of the woods and into the mill was hauled over the coals if his costs were a little more than in the past. Conditions under which labor has worked in the woods have been very difficult and we have come to realize today that the men who work in the woods must have the same comforts and the same decent living conditions that the men who work in the mill have.

Different Problems Now

We have come to face a good many difficult problems and in the solving of these problems, we want the very best trained minds that we can get, but we have to do away with old-fashioned ideas, with old superstitions and with old fetishes; we have got to face these problems in the same way that we have faced engineering and operating problems in our mills.

The cost of labor, the increased cost of material, and the increased cost of equipment of all kinds require that we must pare the cost of our operations down just as much as we possibly can. There is only one way to approach these problems and that is a thorough, practical one; it is on the basis of experimentation. I have always believed that the only way to find out whether a thing was right or wrong—using those words in the sense of whether it is best or not—was to try it out and if, the average business man would spend as much time in trying new methods as he spends in trying to think up ways and trying to think up objections to new methods, we would be a great deal farther ahead.

It is surprising to me, very often, how men who stand high in their industries, who have long experience, when approached by a new idea very often immediately, without any particular knowledge or without any particular thought, begin to think up reasons why that particular idea cannot be put into practice. I have been accused personally of putting forward a great many crazy ideas, but I can say perfectly frankly that I have never put forward an idea yet which has not been carried through, and I think that any man who gets a new idea and will study the thing out carefully and examine his idea and himself thoroughly and then begin to talk about it, can very easily put it across.

Faced with Rising Costs

In our woods operations, as I say, we are faced with rising costs all along the line and we have made absolutely no progress so far as I know since we first began the logging in the old days. We are using the same methods of hauling and almost the same methods of cutting. We have to some extent, of course, substituted the saw for the axe. There has been some effort in the East to use tractors in logging. Of course we have to leave out of this discussion the large timber operations in which machinery of all sorts has been used and where they are coming more and more to do away with hand labor. Of course the large size of their timber and the difficulties of getting it out makes such things imperative.

In the previous years our labor costs have been so low that we have been able to use man power and horses to a very large extent, but the day of that practice is almost past and what we need now in our woods operations is men who will think out new mechanical methods for getting out the small amounts of timber per acre which stand in our Eastern forests and men who will develop these methods and put them into practical use so that we can cut down the expense of our logging operations.

Continued Yield of Forest Lands

Another thing which has come up today which is of the utmost importance is the question of the continued yield of our forest lands. In the language of a forester, we have got to come to a basis of sustained yield. We are not going to be able any longer to mine the timber from our forests as we have mined our coal and metals and oil. The forest is not and never was intended to be mined; it is a growing crop and it must be handled on entirely different lines than our mining operations.

Need for Logging Laws

In order to do this and do it practically, there have got to be some laws in logging enforced so that the forest after logging will be left in a condition where it can continue to produce trees. The time has gone by when we can go into the forest and cut down trees here and there and everywhere, burn up the forest by carelessness; somebody carelessly igniting and sweeping away all our chances of future crop. We have got to leave the forest in a condition to give us another crop and not only another crop but a crop in the very shortest possible time.

In order to do this, we have got to adopt some selective system of cutting. This, of course, will naturally raise the cost of our timber, but only temporarily, mind you. Once this system is established, the cost of logging instead of rising constantly as it does at the present time, will more or less average itself out over a series of years. To make this clear by an example, take a new tract of territory and follow out its history. Especially as we have logged in Eastern Canada, going into a new tract, a logging operation would commence on a river or on a lake and all of the timber which could be gotten out easily and cheaply would be taken out the first year at a very low cost. The second year the operation would have to go back a little further with rising costs. The third, fourth and fifth years, it would be necessary to go further back, with the costs still rising.

If the timber had been taken out back to the watershed the first year, the cost of that year's operations would have been great, but all the timber from the river right back to the end of the operation would have been brought out at once. The next year the same thing would have been done with costs approximately the same, so that while the cost would have been higher the first year, over a series of years your cost would have been uniform.

Everybody knows that when you let a contract to a jobber or

contract to go into the woods, he is not going to care about your interests at all, he is going to take out the timber which it is easy for him to get out and which will net him the biggest profit, and this system of using contractors and jobbers has been the ruination of more forest areas than anything else I know of. It was an easy way to get out the logs and a fairly cheap way to get out the logs, but when you consider the results in the long run, we are going to be a great many years in paying for that sort of logging operation.

Future of Logging Operations

I would like to prophesy a little bit as to the future of logging operations. From what I can see of the trend of affairs in the West and some of the things which are taking place in Scandinavia, and when I think of what has been accomplished in the change of methods in our paper mills and in our great industries, I look forward to the time when our logging operations will be carried on much more by machinery than they are at the present time. I think we are just on the verge of having a mechanical saw which can be carried around easily from tree to tree and with which one or two men can do the work of a dozen. I think that it will only be a very short time until we will have a machine very much like the pneumatic or electric drill at the present day with which the branches can be taken off the trees and can be swamped much more economically than at the present time. I think that American ingenuity will very soon develop types of tractors or mechanical haulers which will enable us to get our timber out to much better advantage and much cheaper than the present methods of skidding it out with horses.

All of these things are perfectly feasible, they are certainly not out of the way and if we would get the best mechanical talent possible and put these problems up to men who have been trained in developing various types of machines, we would soon have great advances.

You all know that the forest today is a collection of good trees and trees which, up to the present time we have found no use for.

To Log to Best Advantage

In order to log to the best advantage today, we have to cover very large areas to get a relatively small amount of timber and I feel sure that the practical men of today and the business men of today will very soon come to realize the futility of covering one or twelve square miles to get a small cut of timber and they will come to the opinion that was expressed in England at the Imperial Conference this year by forty out of forty-five delegates that the day of natural reforestation is very rapidly nearing an end.

This is a very broad statement but at the same time when you come to analyze the situation I think you will, after due consideration, more or less agree with me on this matter. You take large areas of timber and suppose you get from them all the way, on an average of from five to six cords to the acre as we do in Canada,—where we cut under certain Government diameter regulations—I believe you make runs as high as fifteen or twenty cords to the acre—you have got to take your men into the woods, take your provisions long distances and over large areas in order to get out this five, ten or fifteen cords to the acre. When you stop to consider that after you have taken out that timber you have got to wait forty or fifty or sixty years for another crop which, so far as anybody knows at present will be but a very small fraction of the crop which you have taken out in your first cut, you have got to cover these huge areas to get the timber which you need. It would not seem economical or practical to you, and you will surely come to the idea which has been forced on the experience of European countries, that if we are going to carry on our industries, the best way to get the timber is to get areas as near the mills as possible. Plant the areas with the very best possible stock you can get with the very largest amount per acre and then when your logging proposition comes along, look how the whole thing is going to be simplified! Instead of driving or hauling or railing your wood all the way from fifty to 200 miles, let us say, you are going to be able to go out within ten or twenty miles of your mill, put in your portable electric railway, utilize machinery which will cut your trees down just the way you cut your corn crop today and you are going to get instead of five, ten and fifteen cords per acre, forty or fifty cords. You will reduce your logging costs and simplify all of your operations. Instead of huge wood piles which we can see in some of our Northern countries to carry us through the Winter with insurance and money tied up in them, we are going to take the wood right straight from the stump to the mill. We are going to utilize a tree the same day it was cut, perhaps, or the day after.

The Ideal Method

I know that a great many people will be skeptical and a great many people will think this is a crazy idea, but when you come to study the whole thing out carefully and to get right down to brass tacks in the matter, you are going to see that for the future this is going to be the ideal method. You can say, "Of course we won't live to see this; what business is it of ours to provide timber for the next generation"; you can make the same reply that has been made to me many times by managers of wood ladder departments, "What do I care about this, my job is to get wood as long as I am working for this company and when my successor comes along, let him face the problems that are created by the way I am plodding today."

I have even heard managers of companies talk in that way, but gentlemen, today we are coming to realize that we cannot shirk the responsibility of the next ten or fifteen or twenty-five or fifty years.

The paper and pulp industry is, to a great extent, a stabilized industry which in all human probability ought to go on for generations. The mills and the tremendous installations which we have today should not be scrapped in ten or fifteen or twenty-five years, they ought to go on functioning for several generations to come and people who own woodlands certainly have a responsibility to see that those woodlands are kept in productive condition.

A Living, Growing Organism

You have got to face the problem that your forest is a living, growing organism which if properly handled will yield to you the same amount of wood year in and year out just as long as you care to take care of it. Now once we realize that proposition and once that comes home to the practical men who are in charge of mills and woods operations, we are going to see the whole problem solved and solved very rapidly, and I have the greatest hope and the greatest faith that this is going to come about and come about very rapidly.

I just want to say one word about this magnificent programme which the American Paper and Pulp Association have laid out for a national forest policy. I think it is wonderful that every one has been able to get together and agree to this policy, but there seems to me to be a little element of "Let George do it." We are putting this thing up to the Government. We say the Government must do this; the Government must appropriate money; the Government must enact legislation for forest protection, etc., but don't you realize that we are never going to get anywhere unless every man who own timbers, who is interested in the management of timber, does these things for himself first, and then the Government end of it will take care of itself. Unless we begin to do our own work; unless we have fire protection and reforestation on our own lands, we are not going to get anywhere, and unless we take this matter to heart and practice what we are preaching to the Government and what we are preaching to the public, we are not going to get very far with our scheme.

DEVELOPMENT OF INTEREST IN FORESTRY BY MANUFACTURERS OF PAPER

By Frank L. Moore, of Newton Falls Paper Company.

I hardly know how you expected me to handle this subject, "Development of Interest in Forestry by Manufacturers of Paper," in connection with the organization of this Woodlands Section.

I think our problems of forestry should be presented to all manufacturers of paper, whether or not they own woodlands, or whether or not they own their own pulp mills and sulphite mills. The man who buys his ground wood or sulphite or product of the forest is just as much interested in a permanent supply of wood as those of us who go into the woods and cut our timber and produce it into the raw material which might be our finished product.

For a great many years I have talked to various groups of manufacturers when occasion has presented itself and tried to emphasize upon them the necessity of showing more interest in forestry and forest products than they have in the past.

The Folly of Past Years

In the State of New York they have closed up the forests to the public, and you can't break a stick to build a camp fire without violating our State constitution. The newspaper publishers are interested in getting their paper at as low a price as they can, without any idea that that can only continue for the time being and that sooner or later our forests will be depleted unless some action is taken or something is done to make them reproductive. They are beginning to realize now the folly of the methods and plans which they have pursued in conducting this business in years gone by. I have not very much sympathy for them in a way. Their position reminds me a good deal of a story of a Jew that was carrying a pack around the country for a number of years and finally accumulated a thousand dollars, so he thought it was time to move into town and rent a store and invest his thousand dollars in a stock of goods, and settle down and do business as any other civilized man would like to do in his old age. After doing all this he conceived the idea that if he had $2,000 fire insurance he could make another thousand much quicker than he had been able to accumulate his first, so he took out the insurance. One night they looked out across the street and his wife said, "Jacob, there is a fire over there in our store; you must go out and do something or they will think you set fire to it." He ran out, threw up both hands and said: "My God, my God, strike me dead, I am a ruined man." Just then a brick fell off the building and struck him on the head. After he regained consciousness, in the course of an hour or two, he said, "What's the matter with you, God, can't you take a joke?" These newspaper publishers have arrived, in the use of paper, in a position of that kind.

Work for the Woodlands Section

It is fitting, as Dr. Baker said in his opening remarks, that the American Paper and Pulp Association should have a Woodlands Section. I don't believe, myself, in spreading out in too many sections, or too many divisions or too many branches and overlapping one another, but there is work which a Woodlands Section of the American Paper and Pulp Association could well carry on, educational in its character, in studying the problems which confront us all. I do believe, however, that when it comes down to a question of policy of legislation in many of the larger and broader problems of forestry that it should function and work through the existing organizations which have been organized in states and have been active for a great many years and have come to be recognized in the various states as a power in forestry matters.

This Woodlands Section, I presume, if it is organized, will be able to gather information undoubtedly in connection with our timber supply, our forest supply, the condition of our lands, whether they are suitable to reforestry, and all that. That is being done to ascertain extent in some states now by various State agencies and other organizations. It also may develop and be able to supply us with information such as our Madison laboratory is doing in regard to the yield of pulp from decayed wood or from deteriorated wood. Your Executive Committee heard a very earnest plea day before yesterday from Mr. Everest, who is representing Mr. Wolf in behalf of the Forest Products Laboratory in Wisconsin, in asking for money with which they could go ahead and carry on their work in investigating the wastage in our wood piles. Their experiments have shown that the yield in decayed wood in wood piles, where it has been left over in the spring and more piled on top again and is not cleaned up perhaps for one, two, or three years, is about 300 pounds pulp less per cord than it would have been if it had been used up when it was new. They have, through their own investigations, suggestions to make in which that shrinkage can be overcome; and the present high cost of producing wood, getting it to the mill, everything of that kind is something that is of interest to us all, and is a conservation which we all hope and want to practice when it can be brought before us in a way so that we can readily understand and know exactly what it means to us individually. It is hard work in the meeting of the American Paper and Pulp Association to bring all these matters before them because they are all busy. They will listen for a while and then when some one has finished speaking one man says, "Well, I have got to see John Jones down stairs" (perhaps for different reasons now than a few years ago) and he goes down stairs to find Jones and another follows and so on and our meetings dwindle down until there are only a few left.

Must Get Others Interested

Mr. Kellogg has made excuses for the small attendance here, but I don't think excuses are necessary because usually when anything of this kind starts, it starts with a few who are particularly interested and they must go out and tell others of the work which a section of this kind, if organized, is going to do. I think if the invitation had been extended possibly a little more than it was, we might have had more here today. Some thought (I know because they spoke to me) that it was simply for foresters or those who are particularly interested in woods or something of that kind, not thinking that it applied to each and every individual who uses pulp or paper.

Of course, we all know we can go back to the Pilgrims where they landed on Plymouth Rock and measure time from the beginning. It is but a few short years ago when they went into the forests and used the natural resources, the wonderful resources the country had at that time, but in doing it, they were obliged to, as we look at it today, devastate forests and clear up lands, and as civilization has grown and population increased, they have gradually gone back farther and farther into the woods until now it is a time of this country being able to maintain its natural resources, and have its natural resources serve the public.

Nature Must Be Assisted

The time has arrived where nature must be assisted by man. By that I mean that we must advocate a system, plan of legislation

which we outlined to you yesterday, whereby our forests can be made reproductive. Instead of closing up the forests, the decayed trees and matured trees should be cut and give a revenue to the State and be given up for the uses of the people of the State.

It is absolutely foolish for the people of any State—New York State, we will say—to have to go to the Pacific Coast for shingles and to the Southern states for wood. It should be of interest to this section to encourage the development of the growing of woods, make a study of the lands, of the farms lands that are not suitable for any purpose except growing trees, and see that those farm lands are planted so the farmer, when he wants to build a barn, can go out and cut his own wood.

8,000,000 Cords Used Per Year

As Mr. Kellogg stated to you, there are about eight million cords of pulp wood used in this country in a year, but you can travel day after day on a railroad train and hardly see a stick of spruce or pulp wood growing. You have got to get way back in the wilds of the unbroken forests to see them. Those are conditions which are arising on account of the enormous increase in the consumption of paper. If you put eight million cords in a pile four feet wide and twelve feet high, it would reach once and a half across our continent. In a pile four feet high, it would extend thirteen or fourteen thousand miles. Now, that on the average yield per acre of wood, would mean 800,000 to a million acres of timber cut over in a year. We all know that natural growth is not going to take care of anywhere near replacing the consumption of wood that is being used for pulp and paper, to say nothing about the lumber industry and many other industries that are using wood.

Another Cause for Devastation

Another cause perhaps for the devastation of our forests has been the system of taxation. That is a problem that has been studied for many, many years by people interested in our forest lands.

In New York State at the annual meetings of the Forest Products Association for years we have had a student who has made a study of tax problems to talk to us. There should be a system of taxation to encourage a man to keep his forests and cut conservedly. Some day I think we will have a yield tax. That is what he have advocated, those of us who believe in the perpetuation of our forests. That would produce better returns and maintain a forest better than anything else that has been suggested as yet.

Depletion That Is Going on

I have here a little pamphlet, a sheet of the American Forestry Association which I presume most of you have seen. I want to refer to a few things in here in showing the depletion that is going on in regard to our forests and how long it estimates that the timber in this country will last. We are consuming lumber three times as fast as we are growing it. It is predicted that in ten years the yellow pine of the South will be gone and within seven years 3,000 manufacturing plants there will go out of existence. White pine in the Lake States is nearing exhaustion and they are paying $6,000,000 a year in freight bills to import lumber.

The Board of Supervisors in every agricultural county should employ a forester to study the land conditions on the farms of the county and then report the lands that are only fit for growing trees, and have the farmers plant trees there and see that they grow to maturity.

Fires destroy over $20,000,000 worth of timber every year and kills the reproduction of thousands of acres of forest lands. Indications are that the supply of pulp wood timber will be exhausted in twenty years. In New York alone the supply will be gone in ten years. Ten years ago the United States produced enough for its entire news print and now it imports two-thirds of it. Only one-third of the newspapers issued in 1919 were printed on the product of the American forests.

A Matter of Education

Now, to overcome some of the things that are confronting and have confronted us as to the causes of the depletion of our forests is the work which a section of this kind can do, if it is properly handled, and, as I said in the beginning, it is largely a matter of education. In order to remedy some of these troubles, one of the first things to have is a well-defined policy of reforestation. This should be studied and it is policy which your Forestry Committee will advocate and present to the states which are looking forward to legislation in forestry matters what we believe is a practical way in which to handle it. The trouble with many policies of this kind and with our Conservation Committees is their political organizations. I have criticized our committees in New York State many times because they are looking at the problems from a political standpoint rather than from the practical. They have not been willing to accept the views of practical men. I remember only a few years ago I was on a committee to study a bill that was prepared by the Camp Fire Club of America to be introduced in the State of New York. It was absolutely impractical. We killed it by simply asking questions of the committee of the Camp Fire Club that prepared it. They couldn't answer the questions and they made up their minds the bill was not practical and that was the end of it.

Talking Unselfishly

It has been hard work for some of us to make the people who are in a position to administer the affairs of our forest lands believe we are talking to them unselfishly. I have wished many a time that I had what little I know about forests without having any interest in forests whatever, then possibly I might interest them and they would not think I had some ulterior motive in talking to them. In our State, organizations down in the Adirondacks have controlled it largely and they go out broadcast and tell them that we are simply destroyers of forests and at the same time they, themselves, do nothing to help make our forests reproductive, or see that the lumbering operations are carried on in a way to perpetuate the forests or assist us in having our constitution amended so that the matured, dying and decayed crops can be utilized in the interest of the people of the State of New York.

There should be a very defined policy of forest management, not only by the state but by the paper manufacturers and lumbermen. Of course, we all know if we are to have forests, the great thing to do is to keep the fires out. We have a very good system of fire prevention in New York state but we are looking all the while to improve it. If we could have improved it from the start it would have saved many, many thousands of dollars of timber.

One of the things which I think a section of this kind can do is to show us where we can save many of the wastes of our wood today. We all know that in a lumbering operation there is a great deal of waste. We have never thought of it because we have been able to use that part which we could use and make a profit, but we can all remember when we used to go into the woods some fifteen, eighteen or twenty years ago, and cut the hemlock trees for the bark and leave the trees to rot on the ground. In fact, one of the first things I did when I came with the company I am now with was to go up into our woods and pick up the logs of the trees they had cut ten and twelve years for the bark and put them into paper. Perhaps they didn't make quite as good paper but the paper was sold and I was conserving our wood supply.

Dr. Baker will outline the work in good shape and he will send you pamphlets and circulars which you should read and then give him your opinion and criticism, and I believe a great good will be done that will be a lasting benefit to our industry and to those who are to come after us in having forests left for them.

PICTURE TAKEN AT THE ANNUAL CONVENTION OF THE AMERICAN PULP AND PAPER MILLS SUPERINTENDENTS' ASSOCIATION, CONGRESS HOTEL, CHICAGO, NOVEMBER 12.

Municipal & Business Branch Library

SUPERINTENDENTS MEET IN CHICAGO

Fall Convention of the American Pulp and Paper Mill Superintendents' Association, November 12-13, the Most Largely Attended and Successful in the History of the Organization—Many Interesting and Helpful Papers are Read by Representative Men in the Industry—Annual Banquet Is a Big Feature of the Convention—Optimistic Address by President Boyce.

[BY OUR SPECIAL REPRESENTATIVE.]

CHICAGO, November 12, 1920.—The Congress Hotel on Friday morning, November 12, was the scene of the largest gathering of paper mill superintendents ever held under one roof. It might be termed the greatest event in the history of papermaking. The occasion which called together the large number of individuals was the two days' fall convention of the American Pulp and Paper Mill Superintendents Association, and the response to the call for the meeting was significant of the keen interest now being taken in the production end of the industry. The registration for the superintendents started promptly at 9 A. M., and from that moment Secretary Massey and assistants were kept busy, as an elaborate programme for the two days' session has been planned, which necessitated the schedule moving with clock-like precision.

President Fred. C. Boyce called the superintendents together promptly at 10 o'clock, when they listened to an address of welcome from Edward A. Jones, Corporation Counsel of Chicago, acting on behalf of Mayor Thompson who, though listed to speak, was out of the city. President Boyce read the following address, which is interesting on account of its optimistic sentiment and his illumination of the benefits he has derived from the organization:

Remarks by President Fred C. Boyce

"After a year, we have again met at Chicago for our semi-annual meeting, and the growth of the organization has been very rapid since that time, consisting of five divisions, and before our next meeting we expect to have two divisions in Canada. All of the members are very enthusiastic over the organization, and the outlook is very bright for the future, and if we pursue the right lines it will become one of the most beneficial organizations in the paper trade, not only to its members, but to the mills as well. There are quite a few who are from Missouri and want to be shown, but I expect that in the near future they will see the light and will at least meet us half way, for we would like to work in the closest harmony with the balance of the associate members of the American Pulp & Paper Association.

"We had a very successful meeting at Buffalo in June, but it was the first time that most of the Eastern members had a chance to meet with the national organization, and from the many words of commendation the officers had, every one was well pleased.

"Now, regarding the outlook for business in the paper industry during the coming year, while I do not want to pose as a prophet or as the son of a prophet, there are certain underlying conditions in the paper industry which are very different from the underlying conditions prevailing in some other industries, and from these underlying conditions we perhaps may be able to draw a few conclusions that may not prove to be far from correct.

"The recent election which resulted in the selection of Harding and Coolidge by an overwhelming majority and in the election of a Republican House and Senate with safe working majorities, has given a confidence to the business world in the United States that will be reflected in all lines of industry, and in which the paper industry will share. I believe that even our Democratic friends (if there are any Democrats in the paper business), will agree with the statement that the business world has more confidence in the stability of business during the next four years, than they would have had if the result of the election had been different.

"The next year will be one of the years of reconstruction, and during that time we perhaps may see many changes in commodity prices in the different lines of industry, and possibly there may be some changes along these same lines in the paper industry, but on account of the strong underlying conditions in our industry I think we may look forward with confidence to the year 1921.

"There are no stocks of paper in the hands of the paper manufacturers and the stocks of paper in the warehouses of the jobbers are probably smaller than ever before, and on account of the extreme scarcity of paper during the past year the ultimate consumer has not been able to acquire any considerable amount of stock. I think, therefore, we are safe in saying that the stocks of paper on hand today taken as a whole are lower than any time during the past several years. If this is the case, it means that as much paper will have to be purchased from the mills next year as actually consumed, and the jobber and consumer cannot further reduce their stocks.

"On account of but few mills having been built during the past five years, not sufficient to keep up with the normal decreased demand for paper, the ability of the mills today to produce is not sufficient to take care of the normal requirements.

"There has been a little temporary lull in the buying movement of paper in sympathy with the slacking off of buying in other lines, but this will only mean stronger buying later on to replenish depleted stocks. My conclusion is that we may look forward to the coming year in the paper business with security and confidence.

"The dream of years has been fulfilled. Paper has been made at one thousand feet successfully. On October 23 I thought I would visit the plant of the Wausau Sulphate Fibre Company, located at Mosinee, Wisconsin, and, as Derb says, 'It is some paper mill,' organized some eight years ago by Karl Mathis, Neal Brown, B. F. MacMillan, Fowler Stone, G. D. Jones, Louis Dessert, M. C. Ewing and others, who represent all the different business interests in and about Wausau. They have associated with them Ole Backe-Wiig as the practical man, who drew the plans, superintended the erection, and has been in active charge since as manager. Some three years ago Mr. Bache-Wiig, with Frank Monahan, his paper mill superintendent, had a dream that they could make kraft paper at 1,000 feet a minute. They took Stewart Lansing, of the Bagley-Sewall Company, of Watertown, New York, and Mr. Millspaugh, the fellow who had the most confidence in the speed proposition, into their confidence, and these four men designed a machine which they thought would run successfully 1,000 feet a minute. I had heard of this, but did not take much stock in it. For the past six months I have been hearing of the speed they were running—first 800, then 900 feet; so that was what took me to Mosinee on October 23, 1920, to see how they were getting along, as Frank was one of my old boys, and I was much interested in their success. He met me with a smile that only a successful man, and showed me the chart, which was registering about 1,002 feet at that time; and, say, was she running? I should say she was—like a clock, and as smooth as a machine running 300 feet on 20 paper; so that is how the dream came true, and I felt it an honor that I was the first outsider who had witnessed this record in papermaking. I have the chart of this day's run starting at 10 A. M. It shows from 10 A. M. to

1 P. M. 900 feet, and from 1 P. M. to 6 A. M., Sunday morning, 1,000 feet, a continuous run of seventeen hours, and why should I not be highly pleased with this record, for when I walked into the machine room there was Frank Monahan, superintendent; William Voight, the boss machine tender; Rudolph Brosse, machine tender, all my boys whom I had started in paper making, and it shows what men can do when they co-operate, from the manager all along the line to the lowest man on the machine.

"The programme which the executive committee has prepared for you looks very promising from an educational standpoint, and I would like to impress upon you the importance of attending these meetings, and of asking all the questions you would like to ask, for this is what brings out the information of real value. If you have any problems you would like solved, notify the president or the secretary, and he will put you in touch with some one who will try to help you out.

"The banquet and entertainment is something to look forward to, for our entertainment committee has informed me that it will be 'some time.' Thank you. (Applause.)

"What I have just said is supposed to be published, but I want to say in addition that I am mighty glad to see all of you fellows here today. I know that you are going to enjoy yourselves and have a good time. I think the members of the American Pulp and Paper Mill Superintendents' organization have received a large amount of benefit from this organization since it has been started. I know, as far as I am concerned, and I get around a little, there is that spirit of friendliness that has never been in the paper trade before; certainly not among the superintendents. Only last week I had occasion to visit several different mills, and all the superintendents met me with a glad hand. Anything I wanted was mine, except one mill where I drifted in. Of course, naturally, they all start to talk about the superintendents' organization every time I go any place.

That is what they spring on me. This fellow said he had never been to a meeting, and he didn't know whether he wanted to go or not, for we were a pretty rough bunch, and the fellows had a good time sometimes.

"Now, there are certain people in the paper trade, managers, presidents, superintendents, and all along the line who want to stand alone. That is a pretty poor way to stand from the way I look at conditions. We all have our problems. I have been in the paper game for thirty-five years, anyway. I think I know something about the paper business. I can say for the past two years, since this organization was started, that I have got more ideas, more new ideas, and have probably given out more ideas to other fellows, than I ever got before in the thirty-five years that I have been in the paper business. Now, we have all got something to learn, and the superintendent, the manager, or anybody else that wants to stand squarely alone is going backward, not forward. We can help each other solve our problems. We can work together and discuss the different phases of paper making, and we will all receive benefit from them. If you superintendents will attend these meetings and listen to the discussions, you will go back home to your mill and it won't be long before your company will commence to reap the benefit of your attending these meetings.

"As has been stated in some of our meetings before, there are 3,000 paper and pulp mill superintendents in the United States and Canada, and we want to get at least 90 per cent. of those men into our organization. There are one or two different localities where they have not got much use for us as yet. We have not tried to organize, simply people have come in of their own accord. We have had no paid officers. This organization is run by the executive committee and the secretary-treasurer, and the secretary-treasurer does all the work, but I think it is only a question of time when we are going to have the biggest organization in the paper trade.

"Why, it is a funny thing when you get out. I belong to several different organizations, different lodges, the Rotary Club, and things like that, but I never saw anything quite equal to this organization when you get out and talk to each other. It beats the lodges, and it beats everything else. They are just talking paper making all the time.

"We had a meeting here in Chicago of the executive committee, probably a month or six weeks ago. Of course, we always ring in a little paper making on the side. One fellow says, 'Well, we were offered some old paper at $36 for our next month's supply.' One of the other fellows said, 'The old paper market is off. That is too much money.' Now, they had not placed their order yet, and I do not think they ever did place the order, but they might have placed it if this member had not been there, and, of course, he got the tip.

"While the superintendents are not connected with and do not have much to say about the financial affairs, or business part of the company, and they do not want to have in any way, that is not their line, they are in the manufacturing end of it; why, there are certain things when we meet here, and we come from different sections of the country—Michigan, Ohio, Wisconsin, and all around—to the executive committee meetings, we bring in a little news from our section of the country, and it is passed along the line.

You get that first hand. I just wanted to make these additional few remarks. Thank you."

Others Who Addressed the Convention

Others who addressed the meeting and their subjects were Otto Kress, on "Study of Wood and Wood Pulp Infection"; Elbert G. Milham on "Scientific Control," and F. C. Farnsworth on "Steam Condensation and Control."

A luncheon was given at 1 o'clock, and afterward the nearly two hundred present, including the ladies, were taken on an auto trip through the city and its wonderful park system.

An Elaborate Banquet

The large and elaborately decorated Gold Room of the Congress Hotel was well filled when the members of the Superintendents Association opened their social festivities with their fall banquet. This event had been well advertised, and the list of speakers of such renown that, though disappointed by the failure of Judge K. M. Landis and Ring Lardner to appear as scheduled, those present unquestionably had a most enjoyable evening, as the quality of the speakers who were present held the interest of their audience until the curtain was rung down.

President Boyce, after reading the programme for Saturday's session, introduced W. H. Nisbit, of the W. H. Rankin Advertising Agency of Chicago, as the toastmaster. Mr. Nisbit won high favor by his dry wit and never failing purpose to keep things moving at a lively clip. The most surprised individual of the evening was John O'Connell, of the King Paper Company of Kalamazoo, whom Mr. Nisbit introduced as the first speaker. Mr. O'Connell proved that the art of paper making was a more difficult task than that of being an extemporaneous speaker. Charles R. Davis, of the S. D. Warren Company, of Cumberland, Me., who had the distinction of having come the greatest distance to attend the sessions, gave an interesting talk on the benefits of association work, and cheered his audience by stating "that the fundamentals back of the paper industry were too sound to have them seriously affected as other lines of industry by the present general business situation." Mr. Nisbit in introducing the next speaker, Dr. Hugh P. Baker, secretary of the American Paper and Pulp Association, eulogized the latter and, giving an insight into his life's history and devotion to his life's work, which was news to his audience. Dr. Baker talked on forestry and its relations to the paper industry as well as the moral side of life. The earnest manner in which he handled his subject and the forcible way in

which he sent home each thought showed a love for the work in which he is engaged, which has earned for him the distinction of being one of the leading foresters of this continent.

E. J. McCarthy, an official of the National Typothetæ, a "master of the art of printing," spoke on the relations of the printer to the mill superintendent, emphasizing on the necessity of always producing only the highest quality product. During the evening a musical program of exceptionally high character was rendered by the Oxford Quartette, the Meeker Sisters and Miss Ora Henke, well-known Chicago artists.

During the session Saturday morning, which was devoted entirely to reading of special papers, the question of the place for holding the next convention was discussed, and it was voted to have Secretary Massey confer with Secretary Keenan of the Technical Association with a view to having both associations hold a joint convention in June, 1921.

ADDITIONAL NOTES ON PROGRESS IN STUDY OF WOOD AND WOOD PULP INFECTION AND DECAY*

By Otto Kress, in Charge, Section of Pulp and Paper, and C. J. Humphrey, Pathologist.

At the June meeting of the American Pulp and Paper Mill Superintendents' Association the speaker had the opportunity of giving a brief talk on wood pulp infection and decay. Since that time considerable work has been done and the problem of the possible prevention of the loss of pulp through such infection and the curtailment of the spread of decay through the wood storage pile is of such importance that a short outline of the results obtained with a frank discussion and interchange of ideas may not be amiss.

In discussing the results of this study it appears desirable to divide the work into two sections dealing respectively, with the pathological and chemical investigations. The pathological work includes a study of the various molds and wood-destroying fungi commonly found on pulp and pulp wood with the object of preventing deterioration of the pulp during storage and of reducing decay in wood in the storage yard by improved sanitation and minor changes in methods of handling. The chemical study includes an investigation of the chemical changes involved during decay of the wood and wood pulps and a study of the losses involved in pulping infected wood in comparison with sound wood.

Pathological Investigation

The speaker in company with Mr. Humphrey visited during the past summer some eighteen of the cooperating mills in order to secure data relative to the present methods of storage of wood and wood pulp and to determine the extent of prevailing losses. The following remarks are taken directly from a previous report but in view of the tremendous importance of this problem and the losses sustained by the industry we feel that a restatement will not be out place.

Losses from decay in the wood pile at many mills are staggering, the amount of deterioration depending on the method of piling, age of the wood, and sanitary condition of the yard.

Broadly speaking, there are two general types of wood storage: (1) In the yard, either in ricks or in large conical piles; (2) water storage in which the wood is unloaded into the river. It is believed that with certain modifications yard storage is preferable. Water storage by complete submersion is theoretically ideal, as no decay can take place when wood is in a saturated condition; however, under present commercial practices this condition does not hold, for a large part of the logs are floating, with the exposed portion often dried out sufficiently for decay to take place. In addition to this the logs are often jammed or left exposed on the banks at low water; also, when unloaded from cars into the river high piles are built up extending out into the water and the greater portion of this wood is exposed under very favorable conditions for decay, particularly in a zone just above the water line.

As between ricking wood and dumping it from conveyors into large conical piles the consensus of opinion appears to be in favor of the ricks, provided these ricks are separated from each other by continuous air passages at least 3 feet wide to allow for uninterrupted circulation of air.

In general, present wood storage conditions at the mills are deplorable and too much emphasis cannot be laid on the necessity for reforming present practices.

Many of the yards are practically littered with rotten or infected woody or bark debris which serves as a source of infection for new wood and hence should be removed and burned. A considerable number of yards are on low ground which should be filled with dirt, surfaced with cinders, to secure necessary drainage and keep down weeds and grass which impede the circulation of air around the base of the piles.

Likewise good, sound foundations for ricked wood which are well off the ground are conspicuous for their absence. Not a single mill was properly equipped in this respect. Present practice consists either in piling directly upon the ground or on pulp logs laid lengthwise of the piles and often pressed deeply into the soil.

These conditions must be corrected before the mills can hope to control the decay problem. A summary of points to be observed as far as possible in modifying present practices is as follows:

1. Ship pulp logs as soon as possible after cutting to avoid their lying in the wood where high moisture content and growing vegetation tend to cause infection and decay.

2. Peel logs if possible, as this prevents borers from attacking the wood, and also hastens air drying, thus tending to prevent decay.

3. Remove decaying wood from the yard to eliminate the source of infection for new wood.

4. Drain and care for storage yards so as to reduce the soil moisture as far as possible; cut weeds to allow for better ventilation.

5. Fill in yard with cinders; this gives good drainage and keeps down weeds.

6. On removal of a pile of wood, clean up bark and burn skids if they are badly infected. Under all circumstances infected skid logs should be removed. The yard should never be placed on ground filled in with barker waste.

7. Do not rick wood directly on the ground. The best procedure is to put in concrete piers supporting stringers, which have been given a pressure treatment with coal tar creosote, on which to pile the logs. Such stringers should not be brush treated but should be pressure treated and will last at least twenty years. In case it is not considered feasible to equip the yard with concrete piers the next best practice would be to use wood blocking pressure treated with creosote as supports for the stringers. In any case, the stringers should be at least 12 inches, and preferably 18 inches, off the ground so as to allow for ample ventilation from the sides.

8. Mark each log pile as it is received with date at which it was piled and if possible age of the wood. Use up wood in rota-

*Address delivered before the American Pulp and Paper Mill Superintendents' Association, Chicago, Nov. 12-13, 1920.

tion. If ground in the yard is available pile so that the full length of the pile is exposed to the prevailing wind. Never place two piles with less than a three or four foot space between the piles.

9. Where timber is placed in conical piles by conveyors, a possible remedy may be to keep the wood saturated with water by means of an overhead sprinkler system, delivering the minimum amount of water necessary to keep the surface of the pile wet. This is based on the fact that wood saturated with water will not rot because there is not sufficient air within the timber to allow the fungi to grow. Whether it is commercially possible to wet the piles down sufficiently and maintain them in this condition must, however, be demonstrated by actual test. If effective, the mills will have accomplished two objects, namely, protection against both fire and rot. It is our understanding that certain mills are now trying out this scheme mainly on the recommendation of Mr. F. J. Hoxie of the Factory Mutual Fire Insurance Companies of Boston.

Fundamental laboratory studies are also under way to determine the moisture limits at which wood destroying fungi will rot the timber. The results of these tests will indicate just how wet the timber must be kept to check decay.

Study of Infection and Deterioration of Ground Wood Pulp and Possible Means for Overcoming the Same

When this investigation was undertaken it was understood that the study of the causes and possible prevention of infection and decay of ground wood pulp was of primary importance but from observation it appears to us that the prevention of further decay in pulp wood as received at the mill is of greater importance from a monetary consideration. While the mills are receiving and will continue to receive infected wood certain changes in storing, coupled with the use of the piles in rotation, will tend to minimize the loss from decay.

Following out the first supposition the problem was then initially attacked along the lines of preventing the development of molds, bacteria and wood-destroying fungi in stored ground wood and sulphite pulp by the addition of antiseptics to the wet laps either on the wet machine or after removal from it. The method consists in applying the antiseptic solutions in the form of a fine spray by means of an ordinary garden sprayer working by compressed air. Altogether over 5,000 laps of ground wood pulp, approximately 12 inches by 24 inches, and 1,000 laps of sulphite pulp have been thus treated with varying concentrations of 105 different chemicals of possible antiseptic value.

After applying the spray, part of the laps were inoculated with a mixture of a large number of molds previously isolated from badly infected pulp, and the remainder with several species of wood-destroying fungi likewise secured from decayed pulp. The laps were then stored in close piles in a special shed in which both the temperature and atmospheric moisture are held at a point favorable for the development of the organisms.

Inspections are made every four to six months and the condition of the treated laps noted, as compared with untreated pulp stored in the same piles.

Records are taken of the moisture content of both the treated and untreated laps, at the time of spraying, as well as the amount of antiseptic solution applied.

At the present time the two oldest series of these tests have been running 13 and 14 months, respectively. Eleven of the antiseptics in the first series proved highly effective; only two were satisfactory in the second.

Recently one of the cooperating mills sent to the Madison laboratory about three tons of rotten ground wood pulp which was used as a source of further infection for the treated laps which had stood up against previous tests. These laps have been inserted in a large pile of the decayed material and thus given as severe a test as it is possible to devise.

Through the courtesy of one of the cooperating mills we have also been enabled to spray about one and a half tons of ground wood pulp. Thirteen of the more promising of the antiseptics and five additional oils which may prove toxic, were used. The solutions were poured into a barrel above and back of the wet machine. Copper pipes led from the bottom of the barrel to a pipe, perforated with small holes at regular intervals, which extended along the carrying roll and two inches above it. A felt strip was suspended from this pipe to the sheet of pulp. The perforations of the pipe were turned upwards about 15 degrees from the horizontal thus allowing the chemical to flow down the cloth onto the pulp. By regulating the flow of the chemical, measured amounts were put on definite amounts of the pulp. The sprayed laps together with an equal amount of unsprayed pulp from the same run were piled in a basement storage room under conditions favorable for its deterioration. Other pulp will be piled around it and the whole will be left for six months. Then it will be examined to observe the efficiency of the antiseptics against infection.

To date some 70 odd organisms have been isolated from pulp and when it is considered that the antiseptic must prevent the development of any of these different organisms, a better conception is obtained of the difficulities encountered. Further, the cost of the treatment must be considered so as to avoid excessive cost per ton of pulp treated. The problem is also complicated by the high moisture content of the pulp as taken from the wet machine which is only one-third dry, thereby diluting each ton of dry pulp by two tons of water and reducing the concentration, and hence, the toxicity of the antiseptic. Further, some of the antiseptics which gave the best results are too poisonous and dangerous for mill use while others darken or discolor the pulp or injure its quality.

Naturally, the treatment of pulp on the wet machine with even the cheapest antiseptics will add to the cost of the pulp. As pulp, however, must be stored over periods of low water the cost of such treatment must be looked upon as a necessary insurance. Naturally, pulp that will not be stored for a longer period, but will be used within two to three months, needs no protection except the taking of the necessary precautions to store it under sanitary conditions.

The following remedies are suggested to prevent decay of wood pulp during storage:

1. Proper rotation of the piles of pulp, storing if necessary in several smaller piles in order that the oldest pulp will be used up first.

2. The use of antiseptics applied probably in the form of water solutions on the wet machine, provided that the laboratory trials develop a successful and fairly cheap method of treatment.

3. Storage of pulp on concrete floors, avoiding contact of the pulp with the ground or with planks that may have become badly infected from previous pulp. Concrete floors should be provided with proper drainage and after complete removal of the pile should be hosed off, the drain capped, and the floor sprayed with an effective antiseptic as an additional precaution.

4. Avoiding piling of fresh pulp on old pulp, as this spreads the disease in case the older pulp is infected.

5. Removal of badly infected pulp, burning same if too badly decayed for use in paper making, also burning planks, skids and other infected debris in the neighborhood of the pulp pile.

6. Keeping down weeds near the pile and filling the surrounding area with cinders to assist in proper draining of the ground.

Study of the Chemical Changes Involved During Infection and Decay of Wood and Wood Pulp

Through he courtesy of the co-operating mills a number of shipments of infected spruce, hemlock, balsam and aspen wood

and of infected pulps were received for chemical and pulping studies and for isolation of the typical organisms causing the decay.

A brief consideration of the chemical changes involved in the decay of the four chief pulp woods, viz., spruce, balsam, hemlock, and aspen, throws addition light on the astounding losses sustained through the decay of wood and the further losses involved in the pulping of such infected woods.

Complete analyses of sound and infected woods and of pulps made from these woods indicate quite clearly that wood does not break down to the extent that might be expected by a strictly selective action of the organisms either on the cellulose or the encrusting material, but rather by a more uniform degradation of the wood. In cases of extreme decay, however, the cellulose breaks down to a larger extent than the encrusting material.

Assume a unit volume of sound wood weighing 100 pounds bone dry becoming infected so that the wood now weighs only 80 pounds bone dry. The volume through such decay has not changed but it must be remembered that pulp mills are purchasing wood on volume or cord basis and selling pulp and paper on a weight basis. A further loss in pulping now occurs either by the ground wood or chemical processes of pulping in the following way. Pulping trials on infected woods, figuring yields on the weight of bone dry wood pulped, gave us rather puzzling yields of 45 per cent which are equivalent to the yields obtained on a weight basis from sound wood. A large number of cooks thus made by both the soda and sulphite processes on a number of shipments of infected wood in all cases, with but one exception, gave yields on the weight basis of approximately 45 per cent, or the same as is obtained from sound spruce, balsam, hemlock, or aspen. The exception was that of very badly infected spruce which with a cellulose content of 41.99 per cent gave a pulp yield of 39.64 per cent crude pulp containing 1.19 per cent screenings.

In table I is given the essential pulping data on some shipments of typical infected spruce wood.

TABLE I.

Sample	Cook	Crude pulp	Screened pulp	Bleach required	Wgt. of wood per cu. ft. oven dry basis	Cellulose	L Cellulose	B Cellulose	X Cellulose
	No.	%	%	%	Lbs.	%	%	%	%
Infected spruce*..	6	43.9	43.5	14	25.8	46.90	27.75	61.45	10.80
Infected spruce...	7	44.6	43.8	14	28.2	54.18	42.86	37.68	19.46
Infected spruce...	8	47.4	46.8	16	24.0	.....	.....	.....	.....
Infected spruce...	9	39.7	38.4	20	24.1	41.99	18.97	72.92	8.06
Infected spruce...	10	45.9	45.1	16	24.0	.....	.....	.....	.....

The screened unbleached pulps obtained for cooks 6, 7, and 9 were analyzed for cellulose content and for L, B, and X cellulose content. The results of these determinations are shown in the following table:

Pulp from Cook No.	Cellulose %	L Cellulose %	B Cellulose %	X Cellulose %
Slightly infected wood...	96.75	72.96	22.00	5.04
Wood nearly sound.....	95.73	75.83	17.85	6.32
Wood very badly rotted..	94.44	46.05	48.62	5.33

The data indicates plainly that as the decay progresses the percentage of cellulose decreases but far more indicative of the progress of the decay is the decrease in the amount of the X or stable cellulose, and the very decided increase in the percentage of the B or unstable cellulose. This is true both for the raw wood and for the pulps prepared from them.

Papers made under similar machine conditions from pulps prepared under identical pulping conditions, from woods in various degrees of decay, show a decrease in the strength tests especially in the folding test which measures in part the tenacity and brittleness of the pulp. This is shown by a test of 364 double folds for waterleaf paper made from cook No. 6 prepared from slightly infected wood, while waterleaf paper from cook No. 9 from very badly decayed wood made under similar conditions showed a strength of only 26 double folds. Aside from the decrease in strength chemical pulps made from infected wood are more dirty, tend in the case of pulps prepared from badly decayed woods, to hydrate ready and are decidedly darker colored.

These apparent abnormally high yields of pulp can best be explained by the breaking down of the encrusting materials through the mechanisms of decay into simpler compounds that can be readily removed by the cooking liquor without causing a decided degradation of the cellulose present in the wood. There is no question but that in the pulping of sound wood a percentage of the cellulose is broken into simpler compounds removed by the cooking chemical.

If wood was bought on a weight basis then proper allowance would be made for the percentage decay, but this is not the case. For example, if a unit volume of wood weighs in a sound condition 100 pounds and after infection weighs but 80 pounds then assuming a 45 per cent yield there would be obtained yields of 45 and 36 pounds of pulp or an actual loss of 9 pounds of pulp per unit volume of wood. Actual mill trials show that the cord of rossed spruce used weighs 2,400 pounds so that in the example given there would have been on the same basis of decay a loss of 216 pounds of bone dry chemical pulp.

The losses from a groundwood pulp standpoint are even more serious. A mill run on sound and infected spruce showed yield figures, on a weight basis, of 94.5 per cent and 78.5 per cent, respectively, and on a cord basis a yield of 390 pounds more pulp per cord of sound wood than was obtained per cord of infected wood. Aside from these actual losses there is a very decided further loss which, however, cannot be accurately estimated, from the decrease in quality of the stock made from infected wood. The difficulties encountered in using decayed pulp or pulp made from decayed wood are evidenced also by loss in production due to difficulty in drying the paper, increase in size consumption, and amount of longer and better fibred stock required to maintain the strength. Further, the infected pulp is always dirty, off color and decidedly brittle.

Paper Making Tests on Badly Decayed Groundwood Pulp

In a previous paper by Kress, Humphrey and Richards*, the authors described the results of a study of the infection of groundwood pulp in the course of which paper machine runs were made on clean and infected pulp, and the resulting papers compared for strength, color, freeness from dirt, etc. In general, it was found that the infected groundwood of a condition similar to the shipment received at the laboratory, had the following drawbacks in comparison with clean pulp made from similar wood and under similar conditions:

1. Decided decrease in fibre length, thus affecting the yield, felting quality of the stock, strength of the finished paper, and slowness of the stock.

2. Too great freeness of infected pulp. While groundwood pulp is often considered too slow, the extreme freeness of the infected pulp would offer difficulty in carrying the necessary water on the paper machine and in securing a good formation in the finished paper. It should be remembered that only very badly infected pulp is too free. Pulp which is only partly infected is slower than sound stock but as the infection progreses the fibres break up more and the resulting stock becomes very much freer than sound groundwood.

3. Infected pulp is very much darker, thereby dulling either white or colored sheets in which it is used.

*The samples represent different shipments of infected white spruce obtained from different mills. Cooks 8 and 9 are duplicate determinations.

*_The Paper Industry_, October, 1919.

4. The yield of finished paper based on the percentage of groundwood used is decreased approximately 10 per cent.

5. The strength of the finished paper is decidedly reduced. In a groundwood-sulphite furnish this decrease in strength would necessitate the use of a larger percentage of the more expensive sulphite pulp in the furnish.

6. Infected pulp on the paper machine offers difficulty in sticking to the couch and press rolls and in excessive foaming.

7. Infected pulp will require more sizing.

8. Infected pulp will make a very dirty sheet.

While sulphite pulp is normally not stored for a sufficient length of time to deteriorate there is no question that infection will occur provided the pulp is stored under unfavorable conditions. Sulphite pulp, even though it is prepared from badly infected wood, is undoubtedly sterilized during the digestion of the wood but later during piling may become infected.

Apparently, soda and sulphate pulps do not readily become infected and from correspondence with the mills we have not been able to secure an authentic sample of such infected pulps. Rag stock in a bleached half stock form is stored for long periods in drainers but infection of this is extremely rare. One authentic case of such infection, however, was brought to the attention of the laboratory.

Time does not permit to go into details as to the results obtained from the various pulping trials but the complete data will be published at a later date on completion of the study.

	Cold water soluble %	Hot water soluble %	1% NaOH soluble %	7.14% NaOH soluble %	Lignin %	Cellulose %
Sound groundwood	0.13	1.11	10.13	18.28	31.00	60.00
Six months' infected groundwood	6.09	11.06	46.30	62.80	35.30	43.45

Aside from the very large loss due to decrease in weight of the pulp, the large cold and hot water soluble content of the infected pulp would cause a further loss in conversion of the pulp to paper.

Some interesting work is being done at the laboratory to determine the nature of the cleavage products produced during the decay of the pulp. The direct loss in weight is, no doubt, due to carbon dioxide, water, and possibly methane, which are the end products produced through such decay. It will be attempted to measure the quantity of these products from a unit weight of the infected pulp.

When it is remembered that the pulp yield on Northern woods is directly proportional to the weight per cubic foot then the purchase of wood weighing either 28 or 24 pounds per cubic foot makes a decided difference in the weight of actual wood cooked per day. Further, infected wood is brittle, causing a large loss in chipping, as is shown by the following table:

Kind of wood	Loss in screening of ¾-in. chips
Sound Norway spruce	4.43%
Nearly sound white spruce.....	5.62%
Infected white spruce.....	13.22%
Infected white spruce.....	15.60%
Very badly infected white spruce.....	17.02%

It is also to be remembered that chips made from infected wood occupy the same volume space in the digester but will give decidedly lower yields of inferior pulp while consuming the same cooking liquor and steam.

The paper industry must use wood not suitable for lumber, as the latter industry can afford to pay more for their raw material. This means that the pulp mills will purchase inferior wood that is only too often badly infected and unless the proper precautions are observed this infected wood will deteriorate very rapidly during storage.

TABLE II—ANALYTICAL CONSTANTS OF SOUND AND INFECTED WHITE SPRUCE ON OVEN DRY WEIGHT AT 105°C.

Kind of wood	Ash	Cold water soluble	Hot water soluble	Ether soluble	1% NaOH soluble	7.14% NaOH soluble	Copper number	Lignin	Cellulose	Alpha cellulose	Beta cellulose	Gamma cellulose	Pentosan	Methyl pentosan
Sound spruce	0.38	3.47	5.44	1.58	15.07	24.00	5.55	31.31	54.70	63.55	10.37	26.08	11.00	1.88
Infected mill run spruce	0.75	5.54	9.75	1.39	39.92	49.28	17.48	35.21	46.90	27.75	61.45	10.80	9.45	2.66
Badly infected spruce...	0.61	6.58	11.92	1.40	44.00	62.36	23.59	38.20	41.99	18.97	72.96	8.06	8.50	3.77

In table II we have listed the more important chemical constants of three typical spruces, representing a sound wood, a partly infected wood typical of the wood ground daily by one of the large Wisconsin mills, and of the same kind as was used in our mill grinder run and, thirdly, a very badly infected spruce so badly rotted that it was not used by the mill for pulping purposes. Taking the extremes of the sound and infected wood we find such differences as 5.44 and 11.92 per cent hot water soluble material, 24.00 and 62.36 per cent strong NaOH soluble, and 54.70 and 41.99 per cent total cellulose. Time does not permit us to discuss the significance of the analytical constants which have such decided bearing on the pulping characteristics of the wood and of the quality of pulp produced. The curves which I have drawn for presentation at this meeting show the relation of the more important chemical data obtained from a sound spruce and three spruces of varying infection, also the data on sulphite pulps made from these woods under similar pulping conditions.

Triplicate samples of both ground wood and sulphite pulp have been inoculated with the various individual molds and wood destroyers isolated from samples of infected pulp shipped to the laboratory. The first set of these inoculated samples was opened after six months' growth and the samples are now being analyzed. The two other sets of infected samples will be examined at two periods between now and June 1, 1921. In this way definite information will be obtained as to the chemical changes involved during decay through the action of individual organisms. Some of these ground wood samples even after only six months' test are very badly decayed, the worst showing an actual decrease in weight of 18.13 per cent.

The following table gives a comparison of the original sound groundwood and the six months' infected pulp:

Northeastern Superintendents Meet

[FROM OUR REGULAR CORRESPONDENT.]

PORTLAND, Me., November 15, 1920.—The Northeastern Division of the American Pulp and Paper Mill Superintendents association met in Portland last Wednesday with a large attendance from all parts of New England. The session started in the morning at the S. D. Warren plant in Cumberland mills, luncheon being served and a business meeting and inspection of the factory following.

There was a banquet at the Falmouth hotel in the evening, with several speeches, including remarks by Robert Wolf of New York, formerly of the Burgess Sulphite Company, Mr. Burgess of New York, Mr. Sutmeister, J. A. Warren and J. J Sullivan of the Eastern Manufacturing Company, South Brewer.

Those present included B. M. Petrie, H. H. Hackett, Fred Shirley, Fred Karles, Mr. Kane, E. H. Harding, Mr. Ingalls, Fred Hall, B. T. Larrabee, F. A. Verrill, A. M. Waterhouse, Edward Lincoln, N. R. Davis, L. P. Parkman, Mr. Libby of the E. I. DuPont Company, Boston, Mr. Lucas of the S. D. Warren Company plant in Gardiner, Me., Carl True of the Forest Paper Company, Yarmouth, Mr. Stanton, Joseph A. Warren and Mr. Roberts of the DuPont Company.

NEW METHOD OF DRYING PULP*

By F. C. Farnsworth of the Farnsworth Company, Conshohocken, Pa.

The subject of properly drying paper is one that can be discussed with most any paper maker and he will agree that it is a problem that has been of an experimental nature since the inception.

When a paper machine is purchased, what is uppermost in the mind of the buyer is, "How many dryers will be required to dry the amount of paper that the mill has been designed for?" After careful thought on that subject the purchaser takes into consideration what others are doing. He is immediately confronted with a story of one paper maker having dried so many tons per day with so many dryers. The manufacturer that he discusses the matter with undoubtedly says, "No, it will be impossible to dry the volume of paper you want with the number of dryers you have selected." So larger dryers and more of them are obtained.

How Large an Engine Will Be Required?

What is the next item? How large an engine will be required to drive that size paper machine? Undoubtedly it is correct to purchase an engine that will consume steam enough to just about dry the paper. That is, surely it is wrong to purchase an engine too small so that considerable live steam would have to be added to dry the paper.

Now, when the machine is started, production from this mill is not up to standard. Why? Because the drying conditions or drying capacity is not right and 50 per cent. of the mills could produce more paper if they had more drying capacity. That is, if the particular machine that has been purchased dries the paper up to the original expectations or even dries more, then the other portion of the mill is immediately built up and made to correspond to the drying capacity.

What I am trying to explain is that there seems to have been no definite drying capacity for the paper machine to go by. I say this for the reason that we have applied our system to paper machines and increased the production 50 per cent. and we have speeded up fifty feet per minute in many instances. Why was this possible? And this explains definitely in my estimation that no definite capacity of the paper machine was ever to be had.

No Definite Drying Standard

Why is it that there was no definite drying standard? The answer is that no one until recently knew how to get a high velocity of steam through the dryers to absolutely extract all water and air. There have been many types of so-called extractors for extracting the water out of the dryers but there seems to have been no definite plan for extracting the air which is a great factor, with the result that the paper industry has been working along more or less loose lines. They never had a definite known basis for calculating what the maximum drying capacity was available. About three years ago I had been studying sugar mills, and oil refineries, brick yards, and laundries and other types of plants and had made a great success with these in improving their drying conditions. I finally decided to study the paper mill and the first paper mill I visited I asked the manager, "When do you get the best drying conditions regardless of how you use the steam or how you waste it? When do you get the best drying conditions?" He said, "When I open up my return header and blow it out into the room." I then said, "Why not blow the steam through a big majority of the dryers on the dry end and then utilize that steam or blow it into the dryers on the wet end of your paper machine?"

Ideal Method of Extracting

This idea struck him as being unique, and it has since proven to be the ideal method of extracting water and air from the dryers because each and every return pipe coming from the drdyers is not only blowing the water and air and a considerable portion of the steam with it with the result that a high circulation is set up in the dryer and every square inch in the dryer is providing 100 per cent. drying capacity. This method proved to be fine but it required a great deal of experimental work in order to determine where to properly divide the dryers and it necessitated adopting a big steam separator between the dry end section and the wet end of the paper machine to separate the water as the steam was passed into the wet end. It also necessitated a method for forcing the steam through the wet end after the steam had been passed from the dry end into the wet end. It, of course, immediately occurred to me that the only way to create a circulation of steam through these dryers was to force the steam through the dryers of the dry end and so that the steam would keep flowing through these dryers on the wet end.

Results Produced

What results did this arrangement produce? It produced a differential in pressure between the steam header and the return header and it necessitated our placing a steam control valve between the wet end and the dry end of the paper machine so that if insufficient steam came through the dryers of the dry end that additional steam could be admitted to build up whatever pressure should be required on the wet end section. It was necessary to install a gauge board so that the paper maker could see exactly what pressures he had on the steam and return headers of the paper machine.

The condenser that we use for condensing these vapors is a very simple machine, comprised of a small tank divided into two chambers. One of these chambers is always receiving the condensation and steam through the return header and the water is applied through sprays which condense this steam. These chambers alternately fill and empty. That is, when one chamber is filling, the opposite chamber is discharging.

I might explain that this machine works in one respect the same as any type of pump except to pump the condensation from one chamber that has been filled, hot steam is applied on the top of the hot condensate and forces it out to any point to use, preferably to the Farnsworth Boiler Feeders of which I will explain the efficiency later.

High Velocity of Steam Through Dryers

This method as explained causes a high velocity of steam to flow through the dryers. In other words, the steam travels several hundred feet per minute and to these condenser sprays. The sprays in the condenser utilize the make-up water for your boilers. That is, it is better to put the make-up water for your boilers through these sprays and mix your water at this point which absorbs the steam than to mix it in your feed water heater. This process forces a high velocity through your paper machine and at the same time heats the water in the same general way your feed water does.

Should Be No Sluggish Condition

There is not any good reason why the temperatures in your paper machine should fluctuate one degree. In other words if the steam is traveling through your dryers at a certain pressure constantly there shoud be no fluctuation of temperatures or sluggish conditions. What does the presence of air in dryers mean? For illustration take off the automatic air valve from your radiator, plug it up or apply a cock and when air is accumulated in the radiator in a few hours open up the cock and let the air out and

*Read at the convention of the American Pulp and Paper Mill Superintendents' Association, Chicago, August 12-13, 1920.

the radiator will heat up right away. The same thing applies in a paper machine. The air accumulates and will destroy the heating capacities.

Why is live steam so often admitted to the paper machines in addition to the exhaust? It is to heat up the sluggish air and water that is in the bottom of the dryers. Why someone has not thought of forcing a circulation of steam through dryers by the simple method that we do it, is more than I can understand; because it is my experience (and I have visited over three hundred paper mills in this country and Canada) that the maximum production of paper in about 75 per cent. of the cases is gotten by the fact that they are blowing live steam right through their paper machine in order to get a circulation sacrificing their coal pile. But this is no time to sacrifice the coal pile today at the prices of coal and scarcity of coal. The conditions that are in this country and Canada are absolutely ridiculous and in some cases in my estimation should be called to the attention of the government to stop this great waste. I know of at least twenty-five mills today that are wasting over thirty tons per day each mill. Therefore you can easily understand that I mean big mills are wasteful just the same as the small mills.

Production Increased 50 Per Cent

We have installed our system in small mills where we have increased the production 50 per cent. and reduced the coal consumption almost 50 per cent. Think how ridiculous this is. Getting back to the subject of ideal drying conditions from the fact that we force a high velocity of steam through the dryers and divide the dryers to utilize this steam in the wet end, as explained heretofore, naturally the pressure is reduced as it is passed from the dry end into the wet end with the result that the temperature of the dryers on the wet end is slightly lower. This produces the ideal conditions that the paper makers were looking for. Drying paper is the same as any other product. I have equipped a number of drying plants of all kinds and I have found that to produce ideal drying conditions the temperature must be brought up gradually, and I am positive that paper must be dried in the same way. For illustration, the toweling mills need the hottest dryers at the wet end in order to cockle the paper, proving definitely that for ideal drying conditions the temperatures should be reversed with them. The low temperature at the wet end with a gradual increase towards the dry end. At some mills that we have equipped with our system, the paper has widened out two and a half inches, proving that the paper was being dried too dry at the wet end and causing it to cockle. To provide a high velocity of steam through the dryers gives better control of the temperatures. In other words, the slightest operation of the main control valve carrying the steam to the paper machine will provide either higher or lower temperatures, thus reducing the troubles of the paper maker. As stated before, all kinds of devices have been used to extract the water from the dryers of the paper machine. The principal method seems to be a vacuum pump, and I want to explain how ridiculous it is to adapt a vacuum pump to a return line expecting to suck a vacuum or pull a vacuum on a paper machine. First of all, you cannot have vacuum and a pressure in the same vessel. Second, the ordinary vacuum pump will not pump steam. Imagine a steam pipe full of steam and the piston of a pump pulling away from that. How quickly the steam would expand with this piston and as you know, steam expands many times, and if a stroke of a vacuum pump pulled a little steam it expands many times and if a stroke of a vacuum pump pulled a little steam it would only tend to reduce the pressure slightly and no appreciable amount of steam would have been pumped out. And think of it from another standpoint, that in order to suck a cubic foot of steam out of a line you would use a half a cubic foot of steam to pump it. Thousands of people have been fooled on a vacuum pump. Ninety-five per cent. of the vacuum systems have a large cold water line flowing into a suction of the pump. Why, to mix cold water with steam condenses it, and to make it possible for the pump to run which pulls the water out of the line that it has been applied to pump the steam from.

Each Dryer Equipped with Small Trap

A great many of the mills have equipped each dryer with a small trap and I have seen dryers with small traps carrying 70 pounds pressure and a vacuum pump on these traps. I want to point out the ridiculous feature of this arrangement. The pressure in this small trap would force the water out if 70 pounds were carried, and up through a pipe 140 feet high. In other words, it would force the water out of this small trap hundreds of times faster than a vacuum pump could pull it out. If one pound of steam was used on this trap it would force the water out many times faster than a vacuum pump could pull it. Condensation must accumulate in this small trap to raise the float. When it does, the water would run out by gravity and surely a vacuum pump is not necessary to push this little water out because the slight vacuum that might be on this valve might retard this valve from opening as freely as it should. It is generally understood that if these small traps did not work properly then they opened up an adjustment or a small by-pass, and of course the dryers begin to heat up. Why? Because more is being blown away from the return line. In other words, open up the three-quarters return pipe from the dryer, blow it out into the room and see how much hotter your dryer would be. This ideal condition is exactly what we provide for you. Each and every three-quarters pipe coming from the dryer is pulling steam just as hard as it can pull it and each and every dryer is just as hot as steam will make it. And it makes no difference whether buckets or syphons are used. It may be said that you have certain evacuators for forcing the water out of your dryers. What good are evacuators when it comes to getting the air out of your dryers? And air is just as important a factor as the water. I will illustrate in a simple manner how water retards your drying capacity. One inch or more of water in your dryers and the velocity of your dryers will carry this over at least 25 per cent of your dryer. If you are heating your house with water it requires 50 per cent. more radiation. Therefore your dryers covered with water are just 50 per cent. efficient. And if 25 per cent. of your dryer is covered with water then 12½ per cent. of your drying capacity is gone.

Great Loss from Water

There is also another great loss from water in your dryers. It is easily figured that if you have a few inches of water in each of your dryers that you would have tons of extra weight in your dryers. Extra weight means that you have an unnecessary load for your engine to carry. Therefore, if water and air prevail in your dryers naturally you are required to carry a greater back pressure or a greater pressure of steam in your dryers to dry your paper with the result that very often your engine is overloaded and necessitates a larger engine or slowing down your paper machine which of course slows down your production. It is easily understood that if our Forced Steam Circulation System was used that the high velocity of steam through the dryers forcing out this unnecessary water would dry the paper with less back pressure on your engines.

We have equipped over sixty paper machines on which we have reduced the back pressure anywhere from 10 per cent. to 90 per cent., in the majority of cases over 50 per cent. One mill was carrying thirty pounds back pressure on its engine and was about to buy a new engine when our system was installed and they are drying more and better paper with seven pounds and now have ample engine capacity and did not have to purchase another larger engine.

I will now explain why it is wrong to drain your main return header of the paper machine with steam traps. As explained be-

fore, an enormous amount of steam will travel through the three-fourths return pipes of each dryer. The steam is turned into the paper machine, each dryer is filled and steam passes out of the dryers into the return header and the same steam pressure that is on the steam header is on each dryer and is on the main return header. If the finest type of gauge board was used no difference in pressure would be found between the steam and return header and if a gauge was provided on the top of a steam trap the steam pressure would be found the same still. What results does this produce? It is understood that when paper is passing over dryers that the dryers on the wet end are consuming more than twice as much steam as the dryers on the dry end with the result that the dryers on the dry end pass the steam through their syphons or buckets and out into the main return header and fill this main return header up to the same pressure on the wet end as is on the dry end and as the dryers are condensing more steam on the wet end, hence they are retarded from discharging the condensation freely. Furthermore, if a bucket is used and the same pressure is on the return header as the steam header, the water can only flow from these buckets by gravity, and if syphon pipes are used how is the water going to flow from the dryer out into the return header when the return header has the same pressure as the steam header? It will not flow out until the dryer has filled up half full of water and begins to flow out into the return header by gravity which starts the syphon and then the dryer will empty completely.

Machine Test to Prove Conclusions

There is nothing to indicate that 50 per cent. of the dryers of the paper machine would not be filling up to the centers at the same time, and to prove these conclusions I have tested a paper machine and found the condensate coming from the paper machine at the rate of twenty barrels per hour and at other times at the rate of four barrels per hour. Most paper machines have the same condition—slugs of water at times and not much at other times, while as a matter of fact the condensation should be coming from the paper machine constantly and even at all times. It does flow constantly when our system is used. With our system, control by thermostat from any one particular dryer is absolutely unnecessary. The main control valve can be controlled by a main steam header because the temperature in most steam headers is identical with the temperature in the dryers, as the steam is flowing through the dryers at such a high velocity that there could be no difference in temperatures.

Value of Conserving Heat Units

I will not explain the value of conserving the heat units that come from condensation of a paper machine or blast fan coil or any other machine where heat is produced. The temperature of the condensate is within a degree or two of the temperature of the steam at the given pressure. For further illustration, if five pounds of steam were carried on your paper machine the temperature would be about 220 degrees; if ten pounds, 235 degrees; if twenty pounds, over 260 degrees. And for board machines where 30 or 40 pounds and up to 50 pounds are carried, the temperatures range from 250 degrees to 300 degrees. It is absolutely wrong to allow these high temperatures of water or condensation to be cooled down to 200 degrees so that the common pump can handle it. In other words, thousands of pounds of water coming from the paper machine are available at a high temperature. Why not hold it at that high temperature and put it into the boilers? The Farnsworth Closed Loop Boiler Feeding System is a very simple method for holding the condensate under a pressure and feeding it directly into the boilers, and a simple explanation is as follows:

Condensation Drops Out of Headers

Our condensation pump, either Simplex or Duplex, is located under your paper machine on the floor or at the lowest point so that the condensation drops immediately out of the headers and flows into our tank. As the tank is filled with condensation this condensation is equalized with the return header. Thus it is under the same pressure and if a thermometer was inserted in the side of our tank it would be found that the condensation in the tank was within one or two degrees of the temperature of the steam in the paper machines. When this tank is filled with condensation it automatically opens a small high-pressure steam valve which admits high pressure steam into the tank and forces the water out of this tank and up into another tank up over the boilers which is known as our Simplex or Duplex Boiler Feeder. This condensation is held under a pressure from the time it leaves the lower tank until the time it reaches the upper tank. And as one chamber fills up and is emptying the other chamber is always equalized with the return line receiving the condensation from the lower tank under pressure and a high tempertaure. As the receiving chamber fills and the delivery chamber empties the tank automatically changes the boiler pressure steam to the top of the full chamber and forces this water into the boiler at the high temperature or practically the same temperature as when it left the paper machine.

From a Fuel Saving Standpoint

What this means from a fuel saving standpoint. For illustration, if you were using 10 pounds pressure on your paper machine the water would be coming from your paper machine at a temperature of 235 degrees and if 1,000 horsepower of condensation was coming back, 33,000 pounds of hot condensate would be coming into our tanks at a temperature of 235 degrees. If by your old method you were pumping the water into your boilers at 200 degrees we would have increased your temperatures 35 degrees in every pound, or in 24 hours you would pump into your boilers 792,000 pounds and we saved 35 heat units in every pound, so you would, therefore, save 27,720,000 heats units in 24 hours. It is easily determined what value these heat units would have to you as there are only so many heat units in a pound of coal, and in the average plant 50 per cent of these go up the flue, or down the ash pit in the form of poor coal, heavy ashes, or high flue gas temperatures. Furthermore, with our system this water would be put into the boiler with 90 per cent less steam than the boiler feed pump uses on the average. Boiler feed pumps are big steam users, using from three to ten per cent of the total output of steam from your boilers.

Vacuum Pumps Eliminated

If vacuum pumps are used, our system eliminates them, thus of course eliminating the steam that is used by them. I might say that I really believe that 90 per cent of the feed water heaters are cooling devices rather than feed water heaters, because the temperature of the condensate coming from the paper machine or heating system is several degrees hotter than the feed water heater could make it before it enters the feed water heater. In other words, the feed water heater is only a space for the re-evaporation of the high tempertaure condensate—a place for it to flash into steam. And, of course, the open hot-well or the open receiving tank is in my estimation a very great waste and should be eliminated from the plant. It is a ridiculous waste. Thousands upon thousands of plants have high temperature condensation running into the hot-well or receiving tank, or feed water heater, and great volumes of cold water put in there in order to cool this high temperature condensate down sufficient for the pump to handle it with the result that the heater is overflowing into the sewer, wasting valuable condensate which is so much better for the boilers and substituting the raw water from the river, and furthermore the heater is usually vented to the atmosphere and to keep the vents from letting steam go out the roof more water is forced into the feed water heater to cool this down. While

with our system of pumping the hot water with tanks which is to apply the steam on top of the water instead of behind the piston, it makes no difference how hot the water is, in fact, the hotter the better. We, therefore, are able to conserve the heat units in the exhaust that are so often going to the roof, because the engineer or owner does not have the knowledge to conserve those heat units. In fact, his type of pump will not pump the water hot and thus millions upon millions of heat units are lost up the flue or down the sewer.

In Conclusion

In conclusion, we have equipped about seventy paper machines and have equipped the largest mills in the world, in England, Canada, and the United States, and we feel that in every mill we have given results that are producing a dollar each year for the dollar invested in our apparatus and in many mills as much as five dollars per annum for every dollar invested, or anywhere from one hundred to five hundred per cent interest on the investment per annum. Therefore, we feel that we have the evidence to prove that we can produce the results that we have described heretofore and we have an excellent organization of engineers to assist and to help analyze the conditions in each and every mill, and every mill presents a different condition. Our systems are installed under the supervision of our erecting engineer and no responsibility for the success of our installation falls upon the purchaser until we have produced results. Our contracts are drawn giving the purchaser the privilege of returning our apparatus if we do not produce results as claimed for them. Each and every one of our machines are built extra heavy and tested to 300 pounds pressure before leaving our works, and we have recently developed our machines to the highest standard of perfection. Every machine is built with the best of their respective metals, and therefore the maintenance of our machines is very, very nominal indeed.

SCIENTIFIC CONTROL IN THE PAPER MILLS*

By E. G. Milham, Chemical Engineer, Bryant Paper Company, Kalamazoo

If I were a practical mill superintendent, who had been making good paper for years, and I accidentally got into a meeting where someone or other was slated to speak on "Scientific Control," do you know what I would do? I'd just get right up and walk out before I got dangerous. There are probably no two words which have been so abused, misused and overused as "Scientific" and "Efficiency." Consequently, no live mill superintendent can be blamed for seeing red every time these words are mentioned in connection with the operation of his mill. However, if we keep cool long enough to consult our old friend, the late Mr. Webster, we find that "Scientific" really means nothing more nor less than exact. According to this definition, then, every last superintendent here is, to a certain extent, scientific. He couldn't hope to be a superintendent if he wasn't. The word "exact," however, is a relative term and it is right here that the good superintendent shines. He is able, by reason of his abundant supply of common sense, to distinguish between reasonable exactness and pin-headed foolishness. Unfortunately, the same compliment cannot be paid to many persons in the paper industry who do very much talking and very little acting on the subject of scientic control and efficiency.

Now that we have arrived at a mutual understanding as to the meaning of the title, it might be safe to state that the object of this paper is to point out, briefly, a few places where a little more exactness could be used to good advantage in many mills. The points may be logically divided under two more or less closely related headings; namely—control of raw materials, both direct and indirect; and control of the manufacturing processes. These taken together, result in the control of the properties of the finished product. The first point mentioned above is of most vital importance to the superintendent, although it very often receives far too small a proportion of his attention.

Control of Raw Materials

The raw materials which at present offer the superintendent the greatest opportunities for the application of more exactness are pulp, fillers, chemicals and colors, size, twine, felts, wires and belting. These will be discussed separately in the order named.

Pulp

The matter of exactness in the purchase of pulp should be of interest to every superintendent who cannot answer the following questions to his own satisfaction. The questions are:

What weight of air dry pulp do you actually receive every time you pay for a ton of air dry pulp?

How does the average strength of your pulp compare with the average strength of other pulps on the market?

How does your pulp compare with others with respect to cleanliness, color, and general uniformity?

How do the beating requirements of your pulps compare with others?

These are extremely vital questions. In fact, the writer knows of one mill which saved over $10,000 in actual cash in three months by paying careful attention to the air dry content of the pulp which it received. He knows of another mill which claims to save as much as $400 on a single car of pulp by paying attention to such details as dirt, strength, and color. If applying scientific control to pulp pays cash prizes in these mills, there is absolutely no reason under heaven why it should not pay similar prizes in your mill, if you are a buyer of pulp. In addition to this, it will be obvious to every one of you that the direct cash reward is only a very small proportion of the total saving which will result from keeping a more exact check on all pulps purchased.

Fillers

There are few materials more interesting than the mineral fillers. Like most substances which are dug out of the ground, they appear in great variety with respect to both quality and price. As a result of this fact, a superintendent can save his company dollars and save himself trouble by seeing to it that a careful check is kept on the moisture, color, dirt, and grit of each car of filler received. In addition to this, he can save the company any amount of money by being on the job at contract time and seeing to it that the purchasing department buys the type of filler which is best adapted to the grade of paper which he is making.

Chemicals and Colors

The chemicals and colors have been pretty thoroughly standardized by manufacturers during recent years and consequently, there is comparatively little to be gained by paying any attention to them beyond the occasional analyses to check their purity. Lime, however, offers an exception to this rule. Although its manufacture has been more or less standardized, it is rarely, if ever, sold to papermakers on its analysis. As a result, the papermaker, when buying lime, seldom knows whether he is getting 100 per

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cent calcium oxide or 50 per cent calcium oxide and 50 per cent magnesium oxide. This is a matter of great importance because magnesium oxide, owing to its extreme insolubility, is absolute deadwood, so far as the papermaker is concerned. It might also be said in this connection that as the calcium limestones become scarcer and scarcer, there will be an ever increasing tendency on the part of lime producers to ship the papermakers low calcium, high magnesia limes.

There is still another point regarding lime which might be of interest to those of you who use relatively small quantities of it (two or three cars a year). As you all know, lime becomes air slaked when stored for any length of time, and in this condition, is worth very little so far as the papermaker is concerned. In addition to this, the barrels, or other containers, in which the lime is stored suffer tremendously during the slaking process, with the result that the handling of the air slaked lime becomes a mighty disagreeable and costly proposition. This disadvantage can be overcome by using ready slaked lime in place of burned lime. This material comes in sealed paper bags and does not deteriorate appreciably if stored in a dry place. Although one hundred pounds of ready slaked lime will only do the work of seventy-six pounds of fresh burned lime, this loss, under average circumstances, is more than compensated for by the saving on the original cost, freight rate, cooperage, and losses in storage. The writer has met with considerable success in the use of ready slaked lime and can recommend it.

Size

There is probably no material which offers more opportunities for hocus-pocus than does size. This is due largely to the fact that the action of the various sizing materials is not well understood by anyone. Naturally, the superintendent cannot be expected to solve the sizing riddle all by himself. However, he can co-operate to the utmost with the beater man, machine man, technical man, and purchasing agent in an effort to obtain a more complete knowledge of the size requirements in his mill. The opportunities for saving money on the sizing process are practically unlimited, as is shown by the success of a certain engineering firm which you all know, and which takes as its sole profit a small percentage of the total savings which it is able to effect in the sizing processes of various mills throughout the country.

Twine

Twine is an indirect raw material which is used more or less generally in all paper mills. It would hardly seem possible that a superintendent could save his company any money by paying attention to such a small item as twine. However, the writer knows of one mill which is now saving from $1,500 to $2,000 a year on twine alone, simply because it took the time and trouble to find out the kind of twine best fitted to its needs. Of course, $2,000 a year isn't much in a paper mill, but no one can deny that it's worth saving.

Felts, Wires and Belting

The indirect raw materials, felts, wires and belting are extremely interesting and very important, as all superintendents know. At the present time, there are practically unlimited opportunities in most mills for the introduction of more exactness into the selection of these materials. Indeed, there is an opportunity for more exactness in your mill if you cannot answer questions like the following about your felts and wires and your more important belts. The questions are:

How many days was it on?
How many days was it run?
What was the cost per day?
What was the cost per pound of paper made?
How much time was spent repairing it?
What troubles, if any developed during its run?
In what way did it finally fail?

It will be perfectly obvious to every one of you how information such as the above can be turned into dollars. However, let me give you an actual illustration from the X Paper Company. This company had been using "Y" brand dryer felts with good success for several years. In due time a super-salesman from the "Z" company came along, and with a masterful and very plausible sales talk, convinced the purchasing agent that the "X" company was losing a small fortune every day it avoided using "Z" brand dryer felts, which "cost more but were worth it." The result, of course, was that the purchasing agent ordered several of the "Z" brand felts without consulting anyone. Shortly afterward, the boss machine tender's troubles commenced. The felts, in operation, got heavy and soggy and gave no end of trouble by stretching. However, like the game sport that he was, he laid his troubles to the war conditions and remained silent. After several months, when many valuable dollars had been lost, he had a change of heart and complained to the superintendent about the felts. That individual was very much surprised indeed, since he didn't know that the brand of felts had ever been changed. Perhaps the above story is rather unusual; however, it illustrates the point that it pays to introduce more exactness into the selection of raw materials.

Control of Manufacturing Processes

Obviously, the first step in the exact control of the manufacturing processes is exactness in the selection of raw materials. It is the height of foolishness to attempt to obtain one without the other. Although this phase of the subject is extremely important and very interesting, there is only time here for a few suggestions which the writer thinks are very much worth while. These suggestions may well be put in the form of questions such as the following:

1. How many pounds of soda ash and bleach are actually used per 1,000 pounds of any given grade of old papers or rags?
2. How many pounds of size and alum are used per 100 pounds of any given grade of paper? How does this compare with the practice of a year ago? Two years ago?
3. What is the actual ratio between old papers, rags, sulphite and soda pulp in the furnish for any given grade of paper?
4. What is the actual weight of fillers used for beater and what is the retention?
5. At what concentration is the stock run in the beaters?
6. What is the maximum variation in concentration between different beaters?
7. What is the relation between power consumption and concentration of stock in the beater?
8. How accurate is the temperature control on the dryers?
9. What is the average moisture content of the paper at the reel?
10. How can you expect to get a uniform product, not to mention uniform costs, without knowing at least most of the above factors?

The methods by which the answers to the above questions may be found are details which can best be left to the ingenuity of the superintendent. The most important thing being that the superintendent come to realize the value of increased exactness in his manufacturing processes.

Conclusion

In conclusion, it may be safely said that there is still much to be desired in the way of greater exactness in the operation of most paper mills. And, if this paper has brought this one point forcibly home to you, the writer will feel that his effort has not been in vain. Further than this, it is the earnest hope of the writer that this organization will be a potential factor in the bringing of the superintendents to a fuller realization of the importance of science and scientific control in order that the manufacture of paper, our chosen life work, may take and keep its rightful high place among the industrial enterprises of the world.

WILKINITE, A NEW LOADING MATERIAL*

By Sidney D. Wells, Engineer in Forest Products

Somewhat over a year ago, the Forest Products Laboratory came into the possession of a highly colloidal clay through the courtesy of C. R. McKee, of the United States Glue Company, and the possibility of using the material for loading in the manufacture of book paper naturally suggested itself. The material came to us under the name of jelly rock, but on tracing its source, it was found that it is known in trade under the name of Wilkinite, and it occurs in certain parts of the inter-mountain region of the United States in beds, between layers of marine shales. These deposits as exposed by development show in places large amounts of sand-free material sufficient in extent to be of considerable interest to the paper industry. Other deposits, however, are thin, sandy, and of little value.

Complete physical and chemical analysis of the material were available in the records of the laboratory of the Owyhee Chemical Products Company, operators of the deposits described, and for comparative purposes physical tests were made under the same conditions and by the same chemist on the English China play used at the Forest Products Laboratory.

The English China clay lost 12.57 per cent volatile matter, moisture and combined water; 5.5 per cent being the loss in drying at 110° C. for 24 hours. The average analysis of Wilkinite, as obtained from the records of the producers, the Owyhee Chemical Products Company, follows:

	Per Cent.		Per Cent.
Moisture driven off at 110° C..	10.51	MgO	2.90
SiO_2	51.87	Na_2O (K_2O)	1.21
FeO	.11	SO_3	.67
Fe_2O_3	3.40	Loss on ignition.....	7.10
Al_2O_3	20.10		
CaO	1.72		99.59

The physical analyses were made using the "Beaker Method" described in "Principles of Agricultural Analysis" by Harvey W. Wiley. They are given below on two average samples of Wilkinite and a sample of the English China clay:

Division	Name	Diameter in Millimeters	Per cent English China Clay	Per cent Wilkinite	Per cent Wilkinite
1	Medium sand	1 —0.5	None	None	None
2	Sand	0.55 —0.15	None	0.04	0.03
3	Fine sand	0.15 —0.075	0.06	0.41	0.21
3	Very fine sand....	0.075—0.033	5.77	2.02	5.52
4	Silt	0.033—0.008	36.09	3.86	5.75
5	Fine silt	0.008—0.003	12.32	2.23	3.93
6	Very fine silt.....	0.003—0.0015	31.30	17.82	28.39
7	Clay	Finer than 0.0015	14.46	73.62	56.17

It is evident on comparison that while the Wilkinite contains more coarse material than the English China clay; the latter contains very much more material of medium coarseness and less "clay." The coarser material would probably be removed in the riffler on the way to the paper machine, but the medium coarse material could not be handled so easily.

Settling tests on Wilkinite and the English China clay made by the laboratory to determine the ability of these materials to remain in suspension gave very interesting indications. All suspensions containing four or more pounds of Wilkinite per 100 pounds of water showed no indications of settling after standing for periods up to 24 hours, when observations were discontinued. Clay suspensions up to 20 pounds per 100 pounds of water settled out relatively fast; the concentration mentioned showing 13 per cent clear water at the end of one hour and 37 per cent at the end of five hours. The following mixtures of clay and Wilkinite were tried and found to show no clear water throughout the test:

English China Clay (Pounds)	Wilkinite (Pounds)	Water (Pounds)
8	2	100
10	5	100
8	7	100

The first mixture, however, showed 7½ per cent of sediment at the end of five hours. The other two showed complete suspension.

The viscosities of the Wilkinite suspensions increased only about 20 per cent by increasing the Wilkinite from two to eight pounds per hundred, but on raising the concentration from eight pounds to ten pounds it jumped 50 per cent. The viscosity of the clay suspensions up to twenty pounds per hundred were practically constant, and the same as for the two-pound Wilkinite suspension. The first of the Wilkinite-Clay suspensions also had the same viscosity; the second had the same viscosity as the six-pound Wilkinite suspension, and the third the viscosity of the eight-pound Wilkinite suspension.

Briefly, the above tests indicated that Wilkinite suspensions as low as four pounds per hundred will remain in complete suspension through long periods, and that they also have the power to hold in suspension English China clay in amounts up to at least twice the amount of Wilkinite present. The viscosities of the Wilkinite-English China clay suspensions are practically the same as with the Wilkinite alone, and in amounts up to eight pounds of Wilkinite per hundred pounds of water are not sufficiently great to seriously interfere with pumping.

The significance of these tests are that with the use of Wilkinite alone or in combination with other loading materials, the indications are that it would be possible to install central mixing plants and pipe the suspensions to the beaters without any danger of sedimentation or clogging the pipe lines or valves, and with the assurance that the concentration of the mixture would remain uniform.

Semi-Commercial Paper Trials

The laboratory paper-making trials were made on the experimental 16" Foudrinier paper machine, using as nearly identical conditions of beating and on the machine as was possible. The furnishes used in each run are given in Table I, and are the same for each run of each series, with the exception of the kind of loading material used.

Table I

Series No.	Run No.	Bleached Spruce Sulphite Pulp	Bleached Poplar Soda Pulp	English China Clay	Wilkinite	Rosin Size	Alum
		Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
A	1	12.5	12.5	2.50	....	.75	5.27
A	2	12.5	12.5	2.25	.25	.75	5.27
A	3	12.5	12.5	2.00	.50	.75	5.27
A	4	12.5	12.5	....	2.50	.75	5.27
B	1	25.0	....	6.25	....	.75	5.27
B	2	25.0	....	5.63	.62	.75	5.27

The relatively high amounts of alum used were necessary on account of the excessive hardness of the local water and low consistency of stock in the stuff chest.

While the total amount of English China clay or Wilkinite were the same, the proportion of Wilkinite in the loading in the four runs of Series I were as follows:

Run 1, 100 per cent English China clay; Run 2, 90 per cent English China clay, 10 per cent Wilkinite; Run 3, 80 per cent English China clay, 20 per cent Wilkinite; Run 4, 100 per cent Wilkinite. In Series II, two runs were made, using '00 per cent English China clay, and 90 per cent English China clay and 10 per cent Wilkinite. The Wilkinite was received in dry form and

* Read at the annual convention of the American Pulp and Paper Mill Superintendents' Association, Chicago, Nov. 12-13, 1920.

ground rather fine, and was mixed with water into a thick jelly containing 7¾ pounds of Wilkinite per hundred pounds of mixture.

On charging the beater, the Wilkinite was added in jelly form while the English China clay was added in dry form. The beater charges were added in the following order: Pulp, loading material, sizing material, alum. The total time in the beater for each run was one hour, with the roll never down more than light brush. A Jordan was used lightly on the stock as it passed to the paper machine, and all the adjustment of parts in connection with the runs were as nearly identical as possible.

Ash determinations were made on samples of the paper obtained from each run and retentions were made using the following formula based on weights per 100 pounds of furnished.

$$\text{Retention} = \frac{\text{Weight of clay in paper}}{\text{Weight of clay added.}}$$

$$\text{Weight of clay in paper} = \frac{\text{(Per cent ash of paper} \times 100 - \text{Ash in Pulp and Size)}}{\text{(1.00 — loss of clay on ignition)}}$$

The retentions obtained in each run, together with the factors entering into the computation of the same are given in Table II:

Table II

Series	Run No.	Bone dry weight loading material per 100 lbs. ft. D. furnish.	Ash in 100 lbs. bone dry paper	Ash from pulp, rosin and alum in 100 lbs. bone dry paper*	Ash from clay in paper	Weight bone dry clay indicated by ash	Retention
		Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	%
A	1	9.48	5.11	1.44	3.67	3.95	41.7
A	2	9.45	5.99	1.43	4.56	4.90	51.9
A	3	9.41	6.46	1.42	5.04	5.43	57.7
A	4	9.06	7.96	1.40	6.56	7.06	77.9
B	1	20.80	7.90	1.40	6.50	6.99	33.6
B	2	20.73	9.91	1.36	8.55	9.19	44.3

* Ash in pulp, rosin and size found to be 1.5 per cent in similar furnishes with no loading. Proportion of ash from pulp, rosin and size in above runs computed using the following formulae where x = proportion of pulp stock in paper.

$$\text{Per cent ash in paper} = 1.5\ x + (1 - x)\ 93$$

$$x = \frac{93 - \text{per cent ash in paper}}{91.5}$$

$$\text{Ash from pulp, rosin and alum} = 1.5\ x$$

The retentions indicated for each run show a remarkable increase with increased amounts of Wilkinite varying from 41.7 per cent in Series A, Run 1, the 100 per cent China Clay run, to 77.9 per cent in Series A, Run 4, the 100 Wilkinite run. The relation of retention to the proportion of China Clay and Wilkinite are shown graphically in Figure 1, Series A and B.

The increase in retention caused by the presence of Wilkinite was here very striking. It was probably due to the highly colloidal nature of the Wilkinite, which serves to hold the English China clay in suspension throughout the stock as it ran on to the wire and, as the sheet forms, the loading was more evenly distributed. The slowing effect caused by the Wilkinite was very evident on the wire, and the wire mark was diminished on account of the better distribution of the loading material. While the color of the sheets in which Wilkinite and China clay were used together was not noticeably affected, the paper from Run No. 4, in which 100 per cent Wilkinite was used, was noticeably duller. Readings on the Ives Tint Photometer indicated the paper from Series A, Run 1, as 83 per cent white, as compared with a standard magnesia block, while paper from Run No. 4 of the same series was 77 per cent white. It is probable that in papers where a high degree of white are required, the effect of the Wilkinite might prove objectionable. For the majority of book and magazine papers, however, the influence of the Wilkinite on shade could readily be corrected.

Bryant Paper Co. Trials*

The results of the semi-commercial trials on Wilkinite gave indications of such interest that the Bryant Paper Company of Kalamazoo, Mich., consented to make a trial of the material on one of their paper machines, and the writer was invited to witness the same.

Three trials were made in which Wilkinite formed part of the loading material and the proportions were varied as follows:

Table III

Run No.	Air dry weight soda and sulphite pulp and old paper stock	Rosin size, dry basis	Alum	English china clay	Wilkinite
	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
1	500	1.9	19.6	117	13
2	500	1.9	19.6	104	26
3	500	1.9	19.6	91	39
Standard Furnish	500	1.9	19.6	130	..

The paper chosen for the runs was 25 × 38 — 40 lbs. English finish run at 250 feet per minute, using an 80-mesh Fourdrinier wire.

Four beater charges were made in Run No. 1; three beater charges in Run No. 2, and two beater charges in Run No. 3. The beater chest was pumped down to less than ten pounds of dry stock before the first beater of each run was dumped, and all the stock of the run was dumped and run into the machine chest before any of the regular stock was dumped. The same procedure was observed in pumping from the beater chest to the machine chest.

The Wilkinite runs were run over the machine without stopping the machine and, with the possible exception of a slight showing of the stock on the wire, no difference could be detected. The paper in Run 1 was very slightly off color, but the defect was remedied in the subsequent runs by using slightly more ultramarine. The finish of the paper in the Wilkinite runs, however, was much better and the wire mark less pronounced. Even a novice could detect the difference in feel between the Wilkinite runs and the China Clay runs, the former being much more velvety. Samples of paper from each run were tested for ash, as well as samples taken from the machine chest, with the exception of Run 1, in which the loading in the furnish is computed from the beater charge. The samples from the machine chest are used on account of the difficulty of knowing exactly the amount of stock used where it is added in slush form. In Run I, the opportunity to take a sample was lost, and since four beater charges were used, it is felt that any variations of individual beater charges were to a considerable extent equalized.

Table No. IV gives the ash obtained from samples of stock taken from the machine chest and from the paper obtained in the respective runs. The figures for the furnish in Run 1, however, are computed from the furnish used. In making the computations for the above and the other columns, derived by computation, for all the runs the following data were used, obtained by testing the materials involved. All ash and loss on incineration figures are based on bone dry weights.

Ash in reclaimed paper stock and pulp as furnished	4.5 per cent
Loss on incineration, Wilkinite-clay mixture	11.3 per cent
English china clay	12.0 per cent
Moisture in air dry pulp and paper stock	10.0 per cent

Table IV

	Total ash in furnish from machine chest	Ash from stock rosin and alum in same	Ash from loading material in same	Ash in paper	Ash from stock rosin and alum in same	Ash from loading material in same	Retention
	%	%	%	%	%	%	%
1	21.6	3.6	18.0	16.4	3.9	12.5	69.5
2	22.20	3.55	18.65	17.7	3.8	13.9	74.5
3	21.70	3.6	18.1	17.8	3.8	14.0	77.3
Standard Furnish	21.20	3.6	17.6	17.3	3.8	13.5	76.7

* Trials made under the supervision of Mr. E. G. Milham, chemist, Bryant Paper Company, with the co-operation of Mr. A. G. Van Eman, chemist, Owyhee Chemical Products Company, and Dr. Eugene Friedman, Williams Commission Company, distributors.

The retention of loading material obtained in the runs in which Wilkinite was used with English China clay show a consistent increase with increasing proportions of Wilkinite. The relation between the retention obtained and the proportion of Wilkinite used is shown graphically by the curve for the Bryant Paper Company, series in Figure I. The retention for the Standard Finish 76.7 per cent is higher than that obtained for run No. 1 or run No. 2, and does not fall on the typical curve. This apparent inconsistency can not be explained by assuming an error in sampling or ash determinations, since three samples were taken several hours apart, and one was taken one month later, yet all four indicated the same high retention. The only explanation that suggests itself is the fact that the standard runs were made using the regular mill procedure in which the English China clay was piped to the beaters in suspension from the large mill clay-mixing tanks. In the Wilkinite runs, the loading mixture was supplied from a small mixing tank in the beater room, used for experimental purposes in order to interfere with production as little as possible. The clay in the regular mill procedure was mixed at least a day ahead of the time when it was needed in the beaters, while the Wilkinite-clay mixtures were made up only a few hours before use, thereby giving the mill mixture the advantage of a much greater period for complete mixing. In the making of colloidal solutions, it is recognized that prolonged stirring has an important influence on the permanence of an emulsion, and while it was felt at the time that the difference would not have such a marked effect on the results, the retention determinations seem to indicate otherwise. Mill runs in which the Wilkinite-clay mixtures were run through the regular clay mixing system would be desirable to determine this point, and it is hoped that opportunity for the same may be obtained at some future date, when conditions are such that production will not be jeopardized.

In conclusion, we may safely say that the following indications were plainly manifest in the commercial scale trials described above:

1. Wilkinite used in amounts up to 30 per cent of the total loading material, the remainder being English China clay, yields a paper with superior finish, appearance and feel.
2. Wilkinite used in amounts indicated above does not affect the color of white paper more than can be corrected with small amounts of blue coloring agents.
3. In the runs, using Wilkinite with English China clay, the greater the proportion of Wilkinite the greater the retention.
4. Wilkinite causes a slowing of the stock on the wire, with obvious benefit to the formation and distribution of the loading material and reduction of wire mark.

These advantages, together with the ability of Wilkinite to remain in suspension and hold other loading materials in suspension, suggest a considerable field for the use of this material in the paper industry.

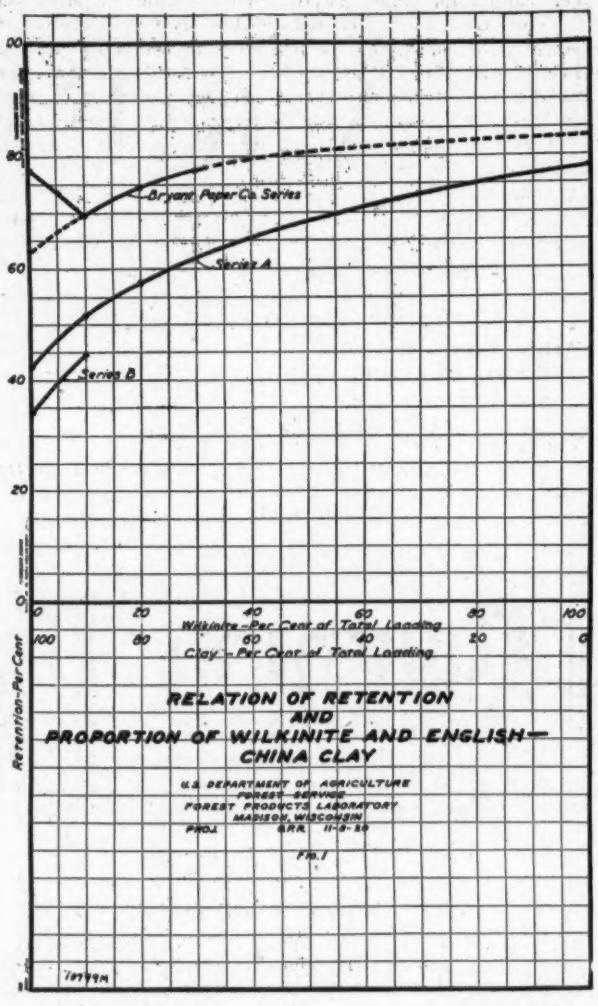
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FIG. 1

SOME FEATURES OF BOX BOARD MANUFACTURE*

By Joseph H. Slater, Formerly of the Ironsides Board Corp., Norwich, Conn.

The paper box board mill, and by that designation we mean all mills making board, whether for paper boxes or for wall board, may be said to be one of the efforts of modern business to turn a large amount of the fibrous waste material of civilization into the largest possible amount of useful material in the shortest space of time and with the least expenditure of labor and capital.

In doing this it is an agency of great benefit, adding mightily to our business resources, bringing comfort and convenience into our lives, and assuming a position of economic importance not easy to describe adequately.

Even the least thoughtful observer must be constantly impressed with the enormous waste of paper and of wood not suitable for lumber and other fibrous material that has gone, and in a lesser measure, is still going on around us. When we consider that our forests are disappearing by hundreds of acres daily, that great quantities of the wood therefrom is converted into pulp and paper, which merely serves to present the history of the world for one brief day, as in the case of newspapers, and for a little longer period in magazines and periodicals, and is then cast aside as waste material and too often destroyed in large quantities, it is at once evident that an extremely serious waste of some of our most valuable resources is going on, both directly and indirectly.

This is a matter of grave concern to our government and to thoughtful men everywhere.

Paper board provides a light, clean and most satisfactory means of protecting and shipping practically every article of clothing we wear. New uses are being found for it daily, and in addition to furnishing a first-class material for containers and interior walls in our homes, it is made into beautiful floor coverings that are

*Read at the convention of the American Pulp and Paper Mill Superintendents' Association, Chicago, November 12-13, 1920.

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equal in appearance to linoleums. Board made from old paper and some new pulp, when subjected to certain simple chemical treatment, is capable of being molded into almost any shape, and made to resemble fine, grained woods, and thus is desirable for a great variety of uses.

Special Department of Paper Making

The marvelous increase in the use of paper board in the past few years has really brought about a special department of paper making, with its own peculiar problems as distinguished from the manufacture of other grades.

The board mills are usually situated in the proximity of the large centers of population, for the reason that freight costs may thus be greatly reduced on the large amount of waste paper the board mills consume, and which is, of course, most readily obtainable near the cities. This is a very important item as it is always desirable to have the maximum carload weight in each car, not always an easy matter unless the paper is very well baled. From the fact that the product of the board mills is almost invariably used in the large consuming or manufacturing centers, it is desirable to have the board mills adjacent thereto, that they may make the board, fashion it into the various types of containers, have it colored, printed, assembled and laid down ready for delivery to the customer. Thus a greater profit is obtainable, less waste is made, labor in handling is reduced to the minimum, and the cost of freight movement is brought to the lowest figure possible. The mill is also in closest touch with its product until it is completed, and thus in a position to quickly rectify any unfavorable or unsatisfactory conditions.

Wisdom of Having Box Department

It seems certain that ultimately the majority of the mills will see the wisdom of making their product, folding and corrugated boxes and also containers into boxes complete in the mill plant.

It is a growing belief that shipping containers is absolutely a direct mill business. The conversion of paper stock to board, then to boxes, eliminates one freight charge and several handlings, and reduces materially the cost of converting into shipping boxes.

Power an Important Factor

Power is an important factor in a board mill, but not so important as in some other types of mills making paper. The only exception we would make to this statement is in the case of a mill making test board or roofing paper, where an abundance of power is certainly very necessary. Steam is the favorite power, for the reason that it is most easily available where board mills are usually located, and other factors of more importance usually dictate the location.

But steam power is desirable, more particularly because very large quantities of hot water are needed in reducing old papers to pulp. Also in drying paper board an abundance of steam is a prime requisite.

With the increase and extension of board mills and their constantly increasing production the matter of beating, or more properly speaking, of disintegrating the old papers used in such vast quantities, has assumed very great importance. To break up this stock properly and economically, and to prepare it to run satisfactorily on the machine in the face of all the constantly varying obstacles to be encountered, is a problem which I think we can safely say has not yet been solved satisfactorily. If it were merely a case of beating up old newspapers, magazines, or clean and thoroughly sorted paper, we might feel that some of the prevailing methods had reached a very satisfactory stage. But in dealing with the enormous tonnage of unsorted paper which is collected and shipped to the mills, and which it appears the mills must accept, to a large extent, on account of the many difficulties of gathering, sorting and shipping, we have to conclude that much yet remains to be done.

New Beating Apparatus

And right here, gentlemen, I want to say that after preparing this article and coming to Chicago I had the extreme pleasure of visiting the Chicago Mill and Lumber Company's mill, and discovered, to my very great surprise, that they had a beater apparatus out there which it seems to me is very much better than anything I have ever seen, and I have seen practically all of them. They have a beater out there with a new device which has been arranged for, rather similar to the Bird extractor, and on one beater of large dimensions with two rolls and two of these extractors, they were providing pulp enough to keep a machine running making five tons an hour.

Certainly a very wonderful performance, and I only wish that everybody who is connected with the board business might have an opportunity to see it.

Methods of Continuous Beating

In this connection it might be well for purposes of discussion to review several of the various methods of continuous beating and consider their merits and demerits.

Let us assume that in all cases hot water is used in beater or pulper and we believe it is important to use an ample quantity of water at a temperature of not less than 120 degrees F. or a temperature as much higher as it is economical to use.

Then we have the different types of mechanism attached to the beater roll curb. With these several types and their modifications, of which there are a number, we assume you are all familiar. These curb devices work fairly well, but are very limited in application for large outputs and are subject to vexatious failure when the stock is stringy or contains a quantity of rags. It is also true that as these devices do not eliminate the foreign material, the beater soon becomes clogged, making it necessary to stop, dump and clean the beater, with a consequent loss of time, which occurs much more often than is desirable or economical.

The same objection holds true in the use of the perforated backfall, which, by the way, may be used in conjunction with the several different heater roll curb devices for separating fibres that have been disintegrated.

Process of Defibering

The process of defibering in a large, heavily constructed special pulper, with a beater roll of large dimensions and heavy wide beater bar filling, followed by a coarse screening provided to allow the good fibre to pass on to pulp thickeners, while the foreign material such as metal, bone, rags, strings, glass, leather, etc., is raked off, has much merit, and aside from its rather large initial cost of installation, and some minor difficulties not yet overcome, seems to be one of the most promising methods recently tried out. However, we must not overlook the exceedingly fine results attained by the use of the so-called Bird extractor. Were the stock always decently clean we might possibly not need to look further for a fairly satisfactory device.

These various methods all have for their object, of course, the quick and economical reduction of old papers to the original fibre, a positive necessity in a large board mill. Practice, however, has shown that frequently very grave faults and disappointing results follow their use. Unless the stock is conveyed to an ordinary beater after being disintegrated, and subjected to a light "brushing" before being "Jordaned" the board made will not always be well bonded, because the fibre is not well "hydrated," and the different layers as made on the cylinder molds, will show a marked tendency to separate.

It will "blow" in being manufactured, or run into so-called railroad wrinkles.

These faults clearly point back to a lack of uniform fibre, or long fibre, or improperly disintegrated fibre, which at once suggests a rather too hasty preparation.

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The numerous faults of nearly all the pulping methods in use, brings us to a consideration of a method of fibre preparation which does give most excellent results, but has the disadvantage of high initial cost, and a rather too limited application when dealing with large tonnages, and is, of course, today considered antiquated.

I refer to the use of large rotary boilers into which the old papers are dumped just as received from the dealers. The rotaries are then closed and the paper steamed, or, if you please, boiled, for a very short time, after which it is pumped to a screening and thickening system. This method softens the paper so that it readily separates from all foreign material in being screened. It goes to the full extent in hydrating the fibres and brings them back to the condition they were in when first used to make paper. The fuel consumption in this method of preparation is probably not any greater than it would be in reducing the fibre by strictly mechanical means and with the aid of very hot water.

Paper fibre prepared in this way, spite of the fact that it has been heated, is inclined to be "slow" on the cylinders, and thus limits speed somewhat. This is doubtless due to the very thorough separation of all the materials from which the paper was originally made, which causes a closely formed sheet free from lumps to be made on the cylinders. Further, this means the formation of a dense board, strong, with good bending qualities, smooth and firm. Desirable features these, but obtained rather too expensively. For this reason it seems that some pulping engine or better method of treating old papers with an abundance of very hot water combined with a violent mechanical thrashing of the beater contents, followed by a constant extraction of the reduced stock to be passed over coarse screens, or a riffler treatment, before being thickened and subjected to the refining engine or Jordan, seems at this time the most logical, and from the standpoint of both quality and economical production, the most promising and altogether satisfactory method.

Yet it must be confessed that no complete arrangement of this kind which has proven even approximately satisfactory, is in use.

We feel this is a department of board mill manufacture with an important unsolved problem, pressing for solution.

Improvements in Drying Board

The constant striving towards larger tonnage per inch of width on board machines, coupled with maintenance of quality, has led and is still leading, towards many changes and improvements, not the least significant of which has been the great attention centered on drying board.

Many mills are adding dryers in large numbers to their machines, and adopting the most improved methods for the circulation of steam throughout the dryers, also providing for the extraction of water from the dryers in a manner that is unquestionable and thoroughly dependable. Fortunately great advances have been made within the past few years in the building of apparatus for the removal of the water of rapid condensation, so that now the board machine dryers may be kept clear of condensation water and a perfect steam circulation assured.

This, together with the Sturtevant apparatus for blowing hot air between the dryers, and at points where the steam vapor arises most thickly, brings about a condition of the air which wonderfully improves and increases the drying capacity on any given number of dryers.

Experience further proves that these improved features dry the heavy sheets of board throughout their entire thickness, thus preventing surface drying and wavy board, so troublesome to the box manufacturer and costly and vexatious to the board manufacturer.

Keeping Board Accurate to Caliper

We might dwell for a moment on the difficulty of keeping box board accurate to caliper. At a previous meeting there was described apparatus for instantaneously recording change in caliper, but, of course, after a machine-tender has the stuff-gate set, and the calendars arranged for a given caliper, we can hardly expect he will be successful in changing the stuff as often as may be necessary. At times, in fact, he may have to change it so frequently as to defeat his own purpose. Therefore, after having stuff-chests large enough and kept well filled with stock properly agitated, the further equipment of the machine with an automatic stuff regulator will secure astonishingly close caliperation. However, again care must be taken to see that the stock is fairly free from such foreign material as metal, string, wood, etc., and this brings us back to the beating problem, the cause of three-fourths of the trouble on a board machine.

Other Important Features

Time forbids that we should discuss at length the many important mechanical features of the board mills and board machines, as, for instance, the recent tendency to adopt the centrifugal *screen* and consequent displacement of the flat diaphragm screen.

The absolute necessity of keeping cylinder wires and felts clean with proper shower pipes is obvious and is being improved.

The great attention that is being given to increasing the length of service of the felts, particularly the cylinder felts by equipping the cylinder molds with ball bearings, by increasing the diameter of the cylinder molds, and also by the installation of helping mechanism to drive the primary or baby press rolls. We might dwell for a moment on the difficulty of keeping box board accurate to caliper. At a previous meeting there was described apparatus for instantaneously recording change in caliper, but, of course, after a machine tender has the stuff-gate set, and the calendars arranged for a given caliper, we can hardly expect he will be successful in changing the stuff as often as may be necessary. At times, in fact, he may have to change it so frequently as to defeat his own purpose. Therefore, after having stuff-chests large enough and kept well filled with stock properly agitated, the further equipment of the machine with an automatic stuff regulator will secure astonishingly close caliperation. However, again care must be taken to see the stock is fairly free from such foreign material as metal, string, wood, etc., and this brings us back to the beating problem, the cause of three-fourths of the trouble in a board machine.

We have no accurate means of knowing just what strain is put upon a felt in turning the cylinders, especially when the suction is on, nor do we know much about the strain of pulling the several primary rolls, but it is undoubtedly much greater than any form of woolen fabric should be called upon to sustain.

The high cost of felts, the lamentable loss of time in changing them, analagous to but much more serious than changing a Fourdrinier wire, the rapid wear of the felts causing very frequent trouble from felt impression on the better grades of box board, all call for improvement.

I believe it is not improbable that we shall have before long a driving mechanism that will revolve and keep in perfect synchronism all the cylinders, primary rolls, and other important rolls of the wet end of a cylinder machine. For the scientific spirit has entered this branch of the paper industry, and the progressive American manufacturer is not content with anything but the best.

The broken down mill turned on to board as a last resort is rapidly being relegated to the past, an awful example of what has been, while clean, well kept, economical, orderly mills, equipped with splendid machinery, adequate for making a reliable, dependable and artistic product, are taking their place. This means pleasant surroundings for employee, the cultivation of a fine spirit of cooperation with the management and success for employee and owners in the coming days of keen competition. Thus the paper board and box industry may pass to still greater usefulness, in conserving our timber supply and transferring waste into innumerable forms of value.

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A STANDARD CONTAINER BOARD*

By Charles E. Raney, Mid-West Box Co.

The manufacture of test liners for corrugated or solid fibre containers is a very broad subject to deal with. This is especially true on account of these liners being made from fibrous materials gathered from all parts of the country. These materials are disintegrated and reformed into a sheet of paper to withstand so many pounds pressure to the square inch before bursting. I do not believe there is a superintendent present who has made test liners who has not experienced trouble in securing a uniform pop test, which is the most exacting standard for liners. I have so far failed to find any two mills using exactly the same burnish or formula for making test liners and do not believe any two mills can, for the reason stated above. The bulk of material used in making liners is gathered together by paper stock dealers all over the country; therefore, how is it possible for the mills to make a standard test liner? You will most likely find each mill has a standard of its own. I have often heard it said of mills with their own box factories: "Oh, well, they can run anything and get away with it because they use the board themselves." I will have to take issue with this remark. In the majority of cases you will find that mills with box factories are more exacting in their standards than those without.

No Standard Paper Stock

One bug-a-boo to the mill making test liners is the paper stock, so-called manilas or fibre papers. There is no standard paper stock source to draw from, and some of these fibre papers have been converted into paper several times previous.

Neither is there a standard graft pulp, although there are a number of good pulps produced from pine, fir, hemlock, spruce, etc., that are more or less uniform. Because of being made from one grade of wood, pulp is the most standard material used in making test liners and is the material upon which the superintendent pins most of his faith to secure the proper bursting strength. Most of you gentlemen get reports now and then from your foreman that the test is going down, and if, upon examination, you find the stock (fibres) of insufficient length, you will probably tell the foreman to have Bill add a few hundred pounds more of Kraft in the next beater down and have Jim slow the machine down until the Kraft gets around.

As to the stock used in the balance of the sheet, each superintendent usually has his own ideas. Mixed papers, box factory waste, old Kraft screenings and news are used in the liner beaters, according to the individual idea of the superintendent of the mill.

In the Mid-west box factories we have never found that a sheet containing Kraft screenings was satisfactory after having been made into boxes, on account of the large unrefined particles of wood left in the sheet. These particles are not resilient and when seasoned in the combined board, cause the liner to break on the scores of the boxes and the finish to rough up easily if the box is stored where it can absorb moisture.

How Standard Test Liners Are Secured

I believe I have covered the principal grades of materials used in the making of test liners and will now try to outline how we in the Mid-west endeavor to secure standard test liners in our own mills. Please bear in mind that I am dealing with .016—85 per cent and 100 per cent test waterproofed liners, as we run these grades exclusively.

The quality of the finished product is wholly dependent on the character of the stock used and the manner in which it is manipulated in the beaters, jordans and on the paper machine, and the liner can be no better than the quality of fibres put into it. We use but three grades of materials in making our liners, namely, manila papers, Kraft pulp and our own box factory waste.

On the manila papers we have an arrangement with a paper stock company whereby endeavors are made to obtain an extra good grade of manilas. Notwithstanding the extra care used in sorting of these manilas, it is still impossible to secure an absolutely uniform grading and some bales will contain stronger fibre papers than others, for reasons stated before.

As to the Kraft pulp, we have used but one particular kind for the past several years, and this only after a long series of experiments with different pulps.

We find box factory waste to be an excellent material to use in the filler of the sheet because it is sorted before it is baled in our own plants; the test stock being shipped to our own mills and the straw to the straw mills. In this way we secure a uniform grading, and this box factory waste, having been disintegrated before, beats up very quickly into short fibres, which help materially in closing up the pore of the sheet.

This covers the grade of the stock we use, and after the formula is established, it is given to the beater engineer and weigher on each tour. The weigher allots the exact weight of each grade to the individual beaters and the beaters are filled as quickly as possible, the Kraft being furnished first and the manilas last in the liner beaters in the order named. The beater roll is then lowered to within a half inch of the bed plate, allowing the fibres to be drawn out and not injured in the early beating stage. Size, starch, color and alum are then added in the order mentioned, sufficient time being allowed to lapse between the furnishings of these ingredients to allow them to become thoroughly saturated in the stock. The beater of stock is then tested with litmus paper to make sure that enough alum has been furnished to get the stock on the acid side. The roll has been left running in the position mentioned above until ten minutes before the beater is dumped, when it is lowered on to the plate.

This process accomplished, the stock passes through the jordans on a very hard brush and onto the screens which must be kept in first-class condition on this grade of board to eliminate particles of any foreign matter which may have gotten into the stock. If these particles were to get into the finished sheet, they would cause weak spots in the sheet and a low Mullen test.

I will not attempt further to describe the operations of our paper mill other than to try to get a close formed sheet and use a rather open bottom felt to allow for quick drainage and a medium close top felt, running the sheet straight through the second and third press to help improve the finish on the liner side. On the dryers we use a temperature control to regulate the drying, also the moisture content of the sheet, Mid-west corrugators making the best board from a sheet averaging seven per cent of moisture. This is a vital point with liner board mills, for if you are buying pulp on a dry basis, it will contain approximately ten per cent moisture and you will have an unaccounted for shrinkage of three per cent, in addition to any shrinkage you may have from other causes.

The Human Element

You, gentlemen, will all agree that the human element has a great deal to do with the manipulating of the stock from the time it is placed in the beaters until it is wound on the reels, and even the Mullen tester can be manipulated to suit the operator. For these reasons, we have in the Mid-West plants a traveling corps of inspectors, who have been schooled in the various standards of both test liners and box making. These inspectors

*Read at the convention of the American Pulp and Paper Mill Superintendents' Association, Chicago, November 12-13, 1920.

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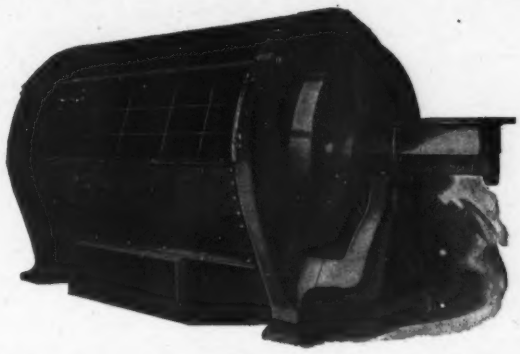

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stay at one plant for two weeks and are then moved on to another plant. In the mills we have one inspector on each tour and it is their duty to make the graph chart which I have here. You will note this chart covers twelve operating hours and shows the Mullen test, weight per thousand square feet, caliper, tensile strength with the grain, tensile strength across the grain, moisture content, waterproofing, number, width, weight, grade and the number of lineal feet in each roll. You will note there are three graph legends used, the red denoting the front side of the sheet, black the center and blue the back.

The inspector is the only person allowed to tear samples from the winding rolls, and samples are tested every fifteen minutes, getting the Mullen test, caliper and tensile strength, the weight per thousand square feet, moisture content and waterproofing being obtained from the end of each roll change.

Variations in Strength

I call your particular attention to the large variation in strength shown between the grain with the sheet and crosswise. You will note that the fibre with the grain shows one hundred per cent stronger. In most all box tests you will find the cross grain score has been the weakest part of the box, and in my opinion this is one thing the mills should work upon—that is, to get a more even distribution of fibres crosswise of the sheet.

Variation in Mullen Test

You will also note the variation in Mullen tests, which seem to be impossible to overcome. In running 100 test, the inspector's dead line is set at 100, and a record made on tests for the front, center and back every fifteen minutes until the roll is wound to correct diameter. This might include six tests for each part of the machine, depending upon the speed of the machine. These tests are then averaged, and if any of the three averages are under 100, the sheet is graded into 85 liner, and if the average is under 85, it is graded as plain Chip. A sample sheet 12 x 12 is kept from each roll and the record on each sample sheet with the inspector's grading is sent to the office of the chief inspector, where they are filed for reference against any complaint. A roll label is also made out and placed on every roll, giving the order, number, size, weight, lineal feet and weight per thousand square feet, and a rubber stamp approval with the date, grade and inspector's name.

You might think that once in a while a sheet testing 99 could be safely passed as 100 test without reducing the test of the combined board. No doubt you are right, but you affect your standard just that much, and the moral effect upon your employes in your broken standards will in the end have a bad effect, and may ruin a reputation for quality which it may have taken years to build up.

THE CHEMIST IN A BOARD MILL*

By Jack Pfister, Waldorf Paper Products Co., St. Paul, Minn.

I presume you have all had the experience of the "Boss" calling your attention to the fact that the last run of container board did not stand up under the moisture test, and that the butter cartons were not water-proofed as they should be, and the customer was complaining. Then your only comeback was, you used the same formula as before and it ought to be all right, or further, you say, "I used a little extra size and alum to make it still better than the last run," but you are sorry to find out that all your good efforts did not help you any, and you get the blame.

Ascertaining Where the Trouble Is

Again, if you are experiencing trouble trying to water-proof container liner with a furnish of kraft pulp, and you find you are unable to get just the water-proofing you would like, you wonder just where the trouble can be.

Again, supposing your steam was low in the boiler room, with coal going into the fire that looked like black diamonds, and you knew your boilers and operation were one hundred per cent, and still you were having low steam, right there is where the chemist would come in mighty handy. It would be pretty easy if you could call in your chemist to find out whether the size and alum were up to specifications, also whether any foreign matter was left in the Kraft pulp that would kill your sizing. And then also as to the coal; he could tell you just how many heat units were in the coal, and how much ash and foreign matter were in the coal that you are trying to use.

Often you find your felts are filled up in an unusually short time, and your chemist could inform you whether you were using enough alum to precipitate your size.

Poor Results in the Beaters

You figure as closely as possible the amount of stock for each beater, then you give your beater foreman your formula for size and alum; if you use a 1,500 beater, you may have ten per cent to twenty per cent stock in this beater, and still you are using the same amount of size and alum.

You can not vary the size and alum, but you can show your beater foreman how important it is to keep his beater furnish, in which sizing is used, as uniform as possible to get the best results.

There are times when you could use less size and alum, as some grades of stock are water-proofed easier than others. It is an easy matter for the chemist to take a little water from your wet-end and inform you as to your conditions, whether the fibers are water-proofed, or whether your water-proofing is going to the sewer.

The Oil Question

Now, take the oil question. You are only using what you think is best, but the facts are not there. The lubricating end of a paper mill is a large and important problem, and needs the proper oil and grease.

Also consider the water entering your boilers. This is very important. Are you using the proper compound, and is the steam entering your dryers carrying too much cylinder oil over? We can get along, discover these things, remedy them to a certain extent, but we cannot get to the bottom of them like a chemist can.

Some of you probably have had experience in matching colors in a board that you want fairly well sized. You find the board does not take the color at the calender stack, in other words, you would like to have the color penetrate into the liner a little more to get the proper shade.

Value of the Chemist

Again, a chemist can help in showing you how to reduce your sizing, and later, if necessary, the sizing could be cut down in the beater room.

We all know of a few tricks in this business but it is usually a trick that the other fellow tried and which worked all right. But it is not as good as knowing exactly what the chemicals you are using will actually do.

There are a good many small mills making chip board, that would have no use for a chemist, but it is the coming thing in the larger mills. We have a chemist at the Waldorf mill and find we would not want to be without him now.

*Read at the convention of the American Pulp and Paper Mill Superintendents' Association, Chicago, November 12-13, 1920.

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NEW STANDARDS FOR MIXED WASTE PAPER*

By Thomas F. Heberly, Schmidt & Ault Paper Co., York, Pa.

During the several years of the late war the great lesson of conservation, especially necessities, was impressed very forcibly upon all of us. The paper manufacturer felt the sting of the shortage of raw material very severely. The demand for wood, rags and waste paper went beyond the available supply. We simply bid against each other until prices were forced up to an unreasonable amount and quality was a secondary consideration. This was especially true in regard to waste paper stock. The pulp mills were doing everything possible to force their plants to their utmost capacity. The only quick and sure relief was a strong campaign for a strict conservation of waste paper and rags. This, as you know, was done with good results. It was very gratifying to know how the news, book, and in fact all the mills making A-1 high grade papers are today using a larger percentage of waste paper with practically no decrease in the quality of their product.

New Grades of Paper Created

We, as board manufacturers, are, of course, more interested in the lower grades of waste paper, generally specified as common or mixed paper. All the consumers of this product were called upon, not only to furnish an increased amount of the then commonly known chip board, bogus or bag wrap, but it was necessary that we develop something better out of this same raw material. This was accomplished with abiding results by some alterations and installation of new equipment, new methods of beating, proper assortment of raw material and various combinations of furnish. New grades of paper, frankly speaking, were created. These new grades are here to stay, and will be improved upon continually to meet the requirements of the ultimate consumers.

Unclean Paper Stock

The excess amount of foreign material in paper stock, especially during the last two years, has been very detrimental in turning out a more perfect sheet of paper. We, of course, do not expect mixed paper to be as clean as book, ledger or shaving stock, but we have a right to get what we order and pay for. We do not specify on our orders for stock, 75 per cent paper and 25 per cent moisture, wood, iron, tin, rags and strings, and the packer is, therefore, not justified in including same in his shipments. It seems always to have been the general practice of including as much of this material with the paper stock, as the various mills would stand for without severe and constant complaint. In order to clean this stock and make it fit for proper use, the manufacturers are put to great inconvenience and expense. Various means for sorting and dusting were installed, and new methods of dissolving, beating and washing are being used with fairly good results. However, when these various kinds of foreign materials have been compressed with the paper, and especially when the bales become damp and wet, it is quite a large proposition to remove it satisfactorily.

It would be a comparatively easy matter and at much less expense if this assorting were properly done by the packer. There is no reason why this should not be done. Why should we not receive the same treatment and care in the filling of our orders, as that given to the purchasers of the higher grades of stock. I realize that the mixed papers are gathered from all points and probably the majority of it under adverse conditions. Nevertheless the paper is all loose originally, and is being baled by someone. He is the man who can most efficiently and advantageously do the sorting and bale nothing but paper. The extra expense in gathering, sorting and compressing nothing but paper will be a very small item in comparison with the present expense at the paper mill.

*Read at the convention of the American Pulp and Paper Mill Superintendents' Association, Chicago, November 12-13, 1920.

Strings and Rags Should Not Be Included

Strings and rags are a perfectly good raw material for certain grades of paper, but are a serious detriment when mixed with paper stock. If they are cut and beaten with the paper stock, the fibres of the paper are destroyed. By using the continuous beating system, you are able to beat off the rags and strings separately. Although if they are properly beaten, they should not be dropped into the chest with the paper pulp as the formation of your sheet will change immediately, causing objectionable spots and making the sheet soft. Your paper is bound to vary as to pointage, weight, general appearance and stiffness. Small particles of ground metals, which adhere to the rags, will show up on your sheet, even though you have passed the stock through quite a settling process. The presence of quite a quantity of parchment, pitch coated and insulated papers has also been a serious hindrance. The appearance of grease and large quantity of black, tar and water-proofing, spots on your finished paper are very objectionable, and are the cause of numerous complaints. When waste papers are used in large quantities, it is hard to detect this objectionable stock, as most of it is made in a duplex sheet. It takes but a small quantity per beater to cause a great deal of trouble. The meshes of your wires are quickly closed with this material, causing numerous light spots and an ununiform pick up.

Need for Putting Up Waste Paper Clean

All the mills, I believe, have been active in trying to devise efficient and economical methods for cleaning mixed paper. Several systems are in use today which are giving good service. It is up to us as individuals, or as an association, to impress upon all packers the necessity of putting up their waste paper clean, free from all the aforesaid foreign material, raise the standard of this grade of packing, thereby greatly assisting to conserve this stock for better grades of paper in the future. Stock that is badly soiled, damp and which contains foreign material should be specified as such when sold.

To Make Sensitized Photo Paper

[FROM OUR REGULAR CORRESPONDENT.]

Dayton, Ohio, November 15, 1920.—Sensitized photographic paper will be one of the chief products of the Dayton Photo Products Company, organized here recently and capitalized at $3,200,000.

The company owns an invention which includes a convertible motion picture camera for home use, capable of taking, printing and projecting motion pictures by reflection with a non-combustible film. A special feature of the production of the machine is the sensitized photographic paper which will be manufactured at the company's plant, located in Edgemont.

The company has taken over the various buildings of the Recording & Computing Machines Company, which during the war turned out munitions for Russia and the allied countries of the world. These buildings cover many acres in extent and will be sufficient for all time.

Behind the project are Will I. Ohmer, of this city, who has been in the recording and computing machines business; Howard F. Wurlitzer, president of the Rudolph Wurlitzer Company, of Cincinnati; F. W. Hochstetter, the inventor, formerly of New York, more recently of Dayton; Arthur H. Lammers, president of the Lammers Engraving Company, Cincinnati and Dayton; H. N. Riehle, H. J. Linkert, of Dayton, and others.

A force of ten thousand men and women will be employed and already the plant is being placed in operation.

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THE MANUFACTURE OF PAPER BOX BOARD*

By Henry Bert, of the Downing Box Co.

As I am not now actively engaged in the manufacture of box board in any manner, shape or form, I therefore feel at liberty to make my expressions more openly than most any other superintendent would be in a position to do.

The past two years in your line of business have been very prosperous, but the conditions that prevail at the present time are pointing in the direction of an equilibrium. Therefore, you can expect to go into competition against one another, and I believe that in some cases the competition is going to be very keen; but there is one line of our industry that has no competition, and that is the manufacture of high-grade container board.

In the past two years most anything could be sold in the line of box board. It did not make any difference what the caliper was, or how the count would run. It did not make any difference whether it was too wet or too dry. Box board was so scarce that is was commonly known around the mills that the box factories were getting anything to make a box out of. This in a great many cases was true. The expression around the mills went on: "It does not make any difference what it is; they have got the paper."

The box factories have taken it, after having assumed the burden for the past two years; but as the conditions are today, it is a question of quality that is going to talk; and from what I have seen, I want to warn some of you as to what you are making, and what you contend you are making.

The first warning I will give is to the man who is claiming to make 100 test board. In connection with this question I am going to say that there have been quite a number of mill owners who have asked me in the last six months how much coal it takes to produce a ton of board. A great many mill owners have been misled in the last two years as to the amount of coal that should be required to manufacture a ton of board.

The people representing the power end of the industry have confined their statements to the word "power." This does not give us any information in the manufacture of box board today. It is a simple question as to how much coal it takes to manufacture a ton of board.

I will give you figures now that are accurate, insofar as making 500 tons of 100 test .016 jute is concerned. Count 105 sheets 26 x 38. Average count, 104½. It requires 2,700 pounds of coal for 2,000 pounds of board, but one thing you must distinctly understand is that the test on this board—I mean the minimum test—was 100, and in lots of cases there were times that this board would test to 130 and in cases to 140, but I am speaking of the minimum 100 test board. It will require these 2,700 pounds of coal.

I know that there have been some superintendents who have been very much embarrassed the last two years on this particular question, as some superintendents will say they make a ton of board with 1,800 pounds of coal. I do not doubt that information, as far as the quality of the board would go. If you are using 1,800 pounds of coal to make a ton of board, any well-informed paper maker or board man will know that the quality of board is in comparison to the pounds of coal consumed.

There is another thing we know, that the modern box board mill is not based on the power proposition. It is a heat unit proposition. The power that may be consumed by the beater or the Jordan does not enlighten us or give us anything to figure on.

As a matter of fact, you may develop 60 horsepower on your Jordan to get a certain fineness and a certain test, and without any change in the formula that might be apparent to the human eye, the test will so change that you will probably be able to cut down to 50 horsepower; or, vice versa, you may have to use 75 to 80 horsepower. I have not seen anybody yet who has been able to make any box board or in fact any other paper by rule. Conditions are changing almost every hour of the day, and it is there where the skill is displayed which the modern paper maker possesses, to keep conditions, or to be able to conform to the conditions as they change from time to time.

As far as the amount of coal per ton of board is concerned, I know mills that have made a ton of board with 1,200 pounds of coal. I know mills that have made 100 test board with one ton of coal, but the difference in the cost in the stock would permit them to use at least three tons of coal per ton of board, if the extra cost in the stock was applied to the cost of coal.

Therefore, it is an equilibrium in getting the 100 test board, and if you will investigate it carefully, you will find that when you get the formula that requires about 2,700 pounds of coal to make a ton of 100 test jute board, you have got the cheapest stock furnished and the minimum amount of coal to make it with.

Of course, you change this and use more strong stock to keep your cost of coal down, but this is not making the money. You are saving one ounce of coal, and are wasting one pound of stock to accomplish the saving in coal.

The ordinary box board mills today will consume more exhaust than is developed in the engine room ordinarily, but during the months of June, July, August and September, if you happen to be running 100 test board, you will have a small surplus of exhaustion going out to the atmosphere. The other eight months in the year this is all consumed in heating throughout the building, and as I have contended before, in some of the articles which some of you have seen, it has come to a place where the power and the box board mills—I mean the modern mills—must be handled with modern methods.

The power is a by-product; and, therefore, if you can develop 1,500 horsepower, and you can consume all the exhaust for drying and heating your water for the beaters, which will come from your engine and pumps, you are simply using that method of condensing the water for your beaters.

The heat unit is necessary for heating the water for the beaters and drying the paper on the machine, and assuming that you are developing 1,500 horsepower, and it becomes necessary to use 1,600 horsepower, the additional 100 horsepower will permit you to carry a higher back pressure, and will dry that much more paper.

Of course, all mills cannot conform to that idea, as some use a certain amount of electrical power, and are therefore forced to use more live steam to dry their paper and heat the water for the beaters.

In this particular 500-ton run, I have told you we consumed 2,700 pounds of coal to produce these 2,000 pounds of 100 test board. That is the average of one week's run, which made 500 tons during the week. The coal that was used on Sunday was figured in against this 2,000 pounds of jute board, which makes the average 2,700 pounds of coal for 2,000 pounds of jute board.

One day in particular it required 3,100 pounds of coal to produce these 2,000 pounds of 100 test board, and one day shows a test of 2,250 pounds of coal for 2,000 pounds of jute board. The formula that was used on this particular run of board was started out on Monday morning, and there were no changes made, as the different grades of stock that were used in this run were as even as could be secured anywhere.

* Read at the convention of the American Pulp and Paper Mill Superintendents' Association, Chicago, November 12-13, 1920.

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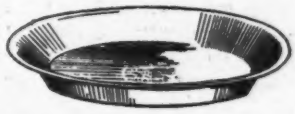

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The sulphate and sulphite was used of one grade. The manila papers were all of one pack, or in other words packed by one man and run very uniform. The mixed papers were also of a uniform grade, so you can see what a vast difference there is in the conditions of making the 100 test board, as comparing one thing with another.

You must bring your superintendents and mill owners to realize that 100 test jute .016 thick, is getting into a fairly high-grade or good grade of board, and it requires a certain amount of energy to produce it. Do not let them get it into their heads hat because someone has told them that they can make a ton of board with 1,800 pounds of coal, that this board is 100 test jute. It is the deceptive things that mill owners are hearing, that are embarrassing the superintendents.

I was in a mill a short while ago. They were running 85 test .016 jute board. The superintendent of the mill asked me to look in his boiler room. He stated that they were wasting considerable coal, and that they were installing a type "E'" stoker to overcome this waste. He used hand-firing boilers. He was making 2,000 pounds of 85 test jute with 2,100 pounds of coal. I have my doubts as to the waste that he felt he was having. I am sure when their test is completed, which they have just started to make, he will find his waste of coal is not as much as he had anticipated; as I know that if he is getting 2,000 pounds of 85 test jute with 2,100 pounds of coal, he is not very far away from what the modern mills are doing.

Of course, chip board for set up box work, folding box work, can be made with a much smaller amount of coal per ton than the jute board or the chip board which is used in the manufacture of fiber and corrugated shipping cases.

Owing to the high price of stock at this time—and it does not look as if we would get a great deal of relief for some time to come, with reference to sulphite and sulphate—it is therefore to your advantage to use the cheap furnish and the cheap stock, and burn a little more coal. You will be money ahead at the end of the year if you try this out.

Data on Shrinkage

I am going to give you a little data on the count and caliper of board and the shrinkage pertaining to a particular run of board. There seems to be an opinion among some box board makers that there is a great deal of value in fiber box cuttings and corrugated cuttings, when used in the manufacture of jute board.

From my observation, I think it is about the most expensive stock that can be used. I am going to give you the dope as I have found it. When you buy 2,000 pounds of fiber box cuttings, this board will run 60, 80 and 100 points in the thickness. Your average moisture that these box cuttings carry is 12 per cent, as against the 5 and 6 per cent which you will find in your mixed paper. You have about a 6 per cent loss there in moisture alone, in weight. The amount of silica of soda figures about 7 per cent, which is soluble in water. You therefore have a shrinkage of 13 per cent in your stock before you have got to the beaters. You still have about a 7 per cent shrinkage in the manufacture of the board. If you go over this matter very carefully, you will find, if you are using all box cuttings, and make a run of chip board and use box cuttings exclusively, that you are using about 2,600 pounds of stock to get 2,000 pounds of finished board. This is the loss that you will get before you get it into board, but after you get it into the dry end of the machine, you will find that if you give it, say, a No. 3 finish as against a No. 3 finish of chip board, your count is running about 4 per cent heavier on the caliper and finish than the board will that is made from ordinary mixed papers.

You take the money you invest in box cuttings, and invest it in some good raw stock, and you get more benefit from the same amount of money than you do out of box cuttings. If you have to stand about a 20 per cent loss in shrinkage of the stock, and then have to allow about a 4 per cent count, or 4 per cent of your run to make up the count, you surely are not getting far in the way of making money by using box cuttings.

The Box Cutting Situation

Look into this box cutting situation very carefully. I have used it in every manner, shape and form that I can think of, and I have come to the conclusion that if it is going to mix with the mixed papers, on a continued run of chip board, you can use about 20 per cent of box cuttings, and then your average shrinkage would not be so large. The only thing that can be said in their favor is that they are clean.

One very big affliction to the box cuttings is in using them in connection with container board. In making .016 jute, the silicate of soda is injurious to the sizing of the board. Some chemists claim that there is no difference, but I found that on investigating the thing and talking with the other board men, there is a vast difference in the sizing of board, and as a matter of fact you cannot make a thoroughly waterproof board when silicate of soda is used in connection with sizing.

In going into the details of this, we find that the chemists cannot answer a great many questions that are advanced to them, nor can they prove them out with figures. I have worked on this sizing proposition and waterproof quality for as much as a year at a time, and this I will say, that when you want to get an absolutely waterproof sheet of board, you have got to make the sizing yourself.

To Get Good Sized Board

I will give you a few of the conditions which must exist when you want to get good-sized board. When you put your sizing in your beater and your stock does not float to a certain extent, you want to get good sized board. When you put your sizing excess, or in other words, sufficient alkali. This in turn requires a larger amount of alum to be used. It is the most expensive way of making a waterproof board, but when the waterproof board is really required, this is what you have got to use to get it.

As I have stated in starting this article, we are coming into competition with one another again, and the only man who will not have competition is the man who makes this superior grade of board.

Watervleit Paper Co. Increases Stock

[FROM OUR REGULAR CORRESPONDENT.]

KALAMAZOO, Mich., November 15, 1920.—At a special meeting of the stockholders of the Watervleit Paper Company, held Wednesday, November 10, at the Park-American hotel, it was voted to increase the present capital stock from $410,000 to $820,000 by the declaration of a 100 per cent stock dividend. The surplus considerably exceeded the new stock issue voted and the action of the stockholders was conservative.

Under the presidency of W. M. Loveland, the Watervleit Paper Company, has enjoyed marked success and prosperity. At the time that Mr. Loveland resigned as secretary of the Kalamazoo Paper Company to take the management of the Watervleit, the latter concern was in a bad way, having lost money steadily for years. The stockholders at that time voted to turn in $200,000 of the outstanding capital. It proved a very wise move, for the stock immediately advanced in price and the mill began to return big profits. From considerably less than par, the stock has jumped to over 35, with none offered at that price. Since the announcement that the capital has been doubled $20 a share has been offered for the new stock with no sellers.

The Watervleit operates a one machine mill, with coating plant adjoining. The buildings as they now stand are capable of housing another machine and complete auxiliary equipment. With an adjustment in the prices for machinery, one of the first moves made by this concern will be to double the capacity. It is expected this will be done during the year 1921.

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MANUFACTURING BOX BOARD*

By L. T. Murphy, Superintendent The Auglaize Box Board Co.

It is quite true that we are all working under various conditions and manufacturing various grades of board. Due to this we all have different ideas in securing the best results, more or less.

Should Use Best Judgment

My idea of securing the best results is that we must take everything into consideration and use our best judgment. We all have our weak points in different ways and the quicker we get busy and reinforce this point or points, the better results we will secure. We all know the different grades of raw material required to make the various grades of board, especially the grades that we are experienced on. The big question is, how is the best way to prepare the stock for the machine?

As some of us are beating our stock the old fashion way, some using continuous beating systems and some cooking and brushing, I feel safe in stating that they are all good methods, but I would recommend the continuous beating method or the cooking method for pulping old papers for any kind of board or paper, as you have a better change to get the grit, bolts, concrete and other foreign materials out of the stock before it gets to the Jordan.

I have heard experienced men state that stock could not be properly beaten for high test container board with a continuous beating system, but some of us are doing it and in time others will. We want slow stock free from dirt and grit for test container board. Slow stock is not short stock; it is stock well brushed or, in other words, beaten but not cut. In some cases the beater roll is let down on the bed plate to cut up the strings and rags, in this case the stock is chopped instead of being properly brushed, therefore, the stock is not properly prepared for test board. We superintendents should know how the stock should be treated for the kind of board we are making as that is one of the most important things we should give attention.

Beaterman Sometimes Inexperienced

In some cases some of our beatermen do not know how the stock should be treated; in this case we should teach them or have them taught. We write our beater formulas, but we do not say anything about beating the stock. Our beater rolls should be kept in good shape; to do this we must not try to wear the bars down to the wood before filling or chipping it, if we do our stock will travel slow and will require more time in the beater. We have not been able to get the stock to travel too fast in the beater. The faster it travels, the quicker it is prepared for the Jordans.

We all know what a Jordan is for and we know that it must be chipped or filed when the bars wear down or it will take a lot of excess power to drive it. For an example: if the shell bars are soft and wear down to the wood before the plug bars do the stock will pass through the opening between the bars in the plug, and the shell being smooth causes a friction; furthermore, if the stock is not properly Jordaned then the result is that the machine-tender will either screw the plug in or or ask the beaterman to do it.

Who Shall Handle the Jordans?

The question has been asked, who shall handle the Jordans, the machine-tender or beaterman? In most cases I would prefer having the beaterman handle the Jordans for different reasons. First the beaterman starts to make the stock and he should be let finish it, then if it is not properly prepared you will know better who is responsible, otherwise, if the stock is too long in some cases the machine-tender will think the beaterman dumped a raw beater and in some cases it has been done, then it will cause friction between the machine-tender and beaterman, where on the other hand, if the beaterman handles the Jordans it will cause the machine-tender and beaterman to co-operate and they are more likely to get better results, as the old saying is, "Two heads are better than one," which is quite true. Suppose we let the beaterman handle the Jordans as the machine-tender can find plenty to do. Now as we are in the machine room we have more problems.

Changing Circle in Vats

Most of us have changed the circle in our vats and some of us find that we get better results with the circle three inches from the cylinder and others with it five to seven inches away. I would recommend the circle being five inches away from the cylinder. For combination board the circulation and suction is the most important thing in forming a good sheet, especially when the stock is in good shape. For a good smooth sheet the suction should be experimented with to get the necessary circulation to correspond with the speed of the machine. The screen mixing boxes and machine should be kept clean or we will be bothered with dirt and slime. It is important that the press rolls are kept in extra good condition or the sheet will have damp spots or streaks in it. Some of us have had trouble with the liner peeling on container board. I find that this is mostly due to the liner stock not being as slow as the filler. To prevent this the liner must be as slow as the filler, if so, it will be almost impossible to separate the two fibres.

We have been bothered, more or less, with sheet deterioration in strength after being made a few hours. Some of this is due to long and short stock. If the liner stock is much longer than the filler, you will notice on the dryers that it is drying much easier than the filler. In this case it will often have a tendency to absorb moist which will loosen up the fibres and cause the sheet to become soft and rough and deteriorate not only in strength, but in quality. We all know what the box maker wants and the best we can give them is not any too good.

* Read at the annual convention of the American Pulp and Paper Mill Superintendents Association, Chicago, Nov. 12, 13, 1920.

Newspaper Men Inspect Paper Mill

[FROM OUR REGULAR CORRESPONDENT.]

Niagara Falls, N. Y., November 14, 1920.—Warren Curtis, Jr., general manager of the Ontario Paper Company, which owns a big, modern mill at Thorold, Ont., was the host of more than a score of prominent newspapermen and businessmen of Chicago, at a lunch at the Niagara Falls Country Club last Friday afternoon. The guests were in charge of S. E. Tomlinson, general manager of the Chicago *Tribune* and consisted of members of the advertising staff and big advertisers in the *Tribune*. The *Tribune* owns the paper company and mill. A special menu was prepared for the visitors, which consisted of every thing that the country could provide for the table and then some.

In the party, besides Mr. Tomlinson, were A. C. Martin, Frank Watson, W. S. Thompson and J. Masterson of the Grand Trunk railroad; Frank R. Hazelwood, Daniel McBain, Walter Merrill, A. C. Curley, J. W. Young, J. H. Wood, M. Antrum, G. F. Kelley, Elmer Stevens, G. N. Schaffer, C. S. Benben, W. E. Donohie, Samuel Faust, Charles E. Frey, Walter D. Hoops, G. R. Goeble, A. N. Uhl, A. W. Crawford, E. W. Parson, W. E. McFarland, Chicago *Tribune*, and Superintendent John J. Ryan and M. Derrigal of the Ontario Paper Company.

The party arrived in two private Pullman cars over the Grand Trunk at 1.30 p. m., Friday, and made a most thorough inspection of the mills at Thorold. Manager Curtis was praised by the visitors for the manner in which the plant is conducted. The return trip was started after the lunch.

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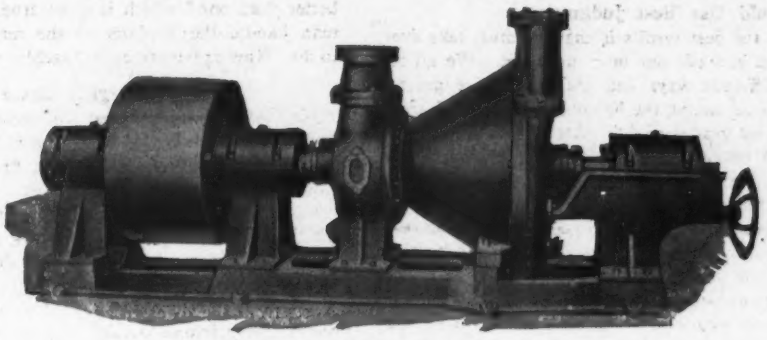

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ALKALI RECOVERY IN THE SULPHATE PROCESS*

CLINTON K. TEXTOR

The sulphate process, like other processes of pulp and paper making, has been developed and operated with a good deal of secrecy and mystery; furthermorg, it is the latest to be developed and in consequence it has comparatively little published data of good authority, most of the literature on this subject being of a descriptive or speculative nature. This article then is of necessity based on personal experiences and observations in a few mills which I believe may be taken as typical of American practice.

In considering the recovery of alkali, this paper does not limit itself to a discussion of the design and operation of the "Recovery Room," by which name we usually refer to the room containing the smelters and incinerators, but to all those features which affect recovery from the time the chemicals enter the digester to the time they are returned there to be used again.

Digester Room

The principal bearing of the cooking operation upon the recovery process is in regard to the dilution of the liquors, which in turn determines the amount of work that will subsequently have to be done by the evaporation equipment.

As by far the greatest proportion of sulphate pulp made in this country is used in the manufacture of kraft papers, in which a high color is not essential, the usual procedure is to add to the chips in the digester sufficient chemicals in the form of white liquor to perform the cooking and to add black liquor to make the total volume of liquids sufficient to cook all the chips.

In this way the mill is spared the evaporation of a volume of water equal to the volume of the black liquor added, with the equivalent saving of heat.

The use of black liquor in the digester has another effect on the recovery, of which we have no explanation. When, for any reason, no black liquor is used in cooking, it soon becomes difficult to keep the incinerators producing the desired quality of black ash, although they are kept supplied with liquor of the same concentration as before.

For the ordinary practice, figures as low as 1½ and as high as 3 pounds of steam have been given as necessary to cook one pound of pulp; personal experience has indicated that 2 to 2¼ pounds of steam were used, depending upon the atmospheric temperature, the moisture in the wood and other factors. The difference between the maximum and minimum figures applied to a 50-ton mill would mean a difference of 75 tons of water to be evaporated per day, which would require 65 h.p. under average conditions.

The use of indirect steam in cooking would, of course, mean a great saving in the water which would have to be evaporated. This method, however, presents mechanical difficulties and its adoption depends on how well these difficulties are solved. A preliminary drying of the chips has also been recommended as a means of reducing the dilution of the black liquors, but unless some source of heat which is otherwise wasted is available for this drying, it is not probable that chip dryers will be widely used for the purpose of increasing concentration, as this concentration can doubtless be accomplished more efficiently with the apparatus now employed.

Diffuser Room

The washing of the pulp represents a very important step in the recovery process as it involves not only dilution of the liquors, but considerable losses of alkali. The majority of modern mills wash their pulp in diffusers, but the diffuser capacities vary so much that it is very doubtful if any practice can be considered standard. Some mills operate very successfully with two diffusers per digester while others have as high as four. Perhaps the commonest arrangement is about three diffusers per digester where each digester blows every four hours. In a mill so equipped, about ten hours can be allowed for the pulp to be washed and the diffuser emptied.

In a typical mill having ten hours for washing, the diffusers are operated in pairs. When a charge is blown into one diffuser, it is first washed with weak black liquor from its mate, the black liquor coming from the fresh charge, testing at first 12 or 13° Be., is sent to the evaporators until the test has dropped to 6° Be. when it is held until its mate has received a blow. This scheme will keep the evaporators supplied with a 10° liquor. In the meantime, the mate has washed down to 0° Be. when it is considered sufficiently free from alkali; it is then disconnected and emptied and if the last blow has not been washed down to 6° the washing is continued with water until the point is reached.

The above mentioned change in the density of the black liquor received from the digester and delivered to the evaporators, from 13° Be. to 10° Be., means that to every gallon of black liquor received with the pulp from the digester, almost a gallon of water is added before it is delivered to the evaporators.

In a plant in which the digesters were heated with indirect steam and which has four diffusers per digester, the black liquor was consistently delivered by the diffusers at a concentration of 16° Be.

The losses of chemicals during the washing is not so easily estimated though it is probable that the losses at this point are considerably greater than is ordinarily supposed.

Evaporator Room

Evaporator operation is one which is fairly well standardized in its general application, but the conditions of the several sulphate mills are so different that hardly two are operated alike, due to their receiving and delivering liquors of widely varying concentrations.

A quadruple effect evaporator receiving black liquor at 10° and delivering it at 20° indicated a consumption of 2½ lb. of steam per pound of pulp produced, but this figure is not entirely reliable as both live and exhaust steam was used and due to peculiar local conditions, some of the meter readings were questionable.

Mills using indirect heat in cooking usually operate without any vacuum evaporators.

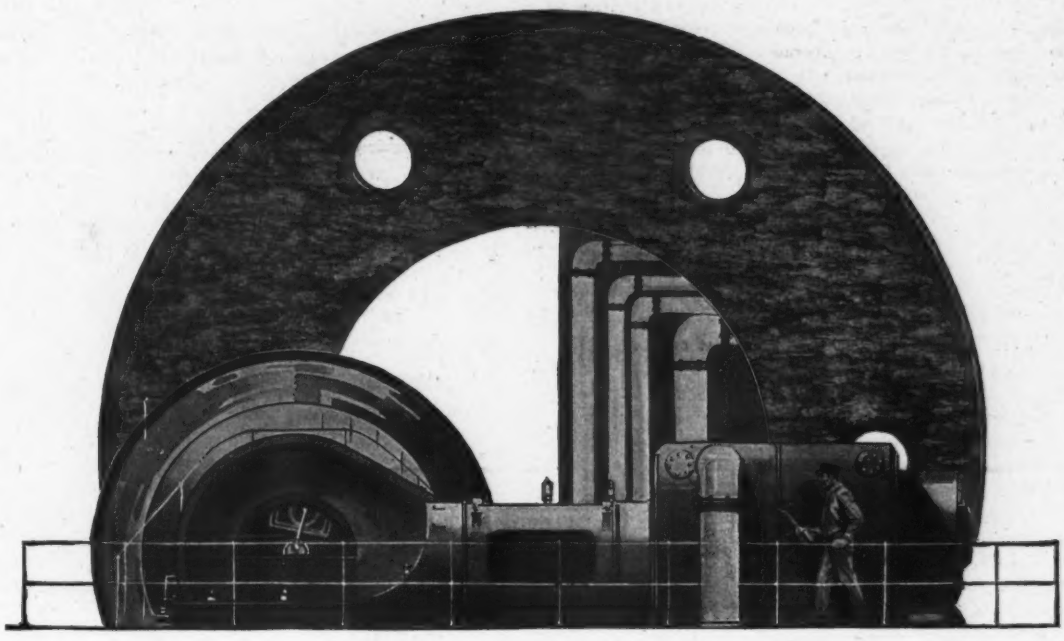
Recovery Room

The function of the recovery room is to receive black liquor from the diffusers or evaporators, make up for losses of alkali in the cycle by the addition of salt cake, and deliver to the causticizing department the so-called green liquor, a solution of sodium carbonate, sodium sulphide and minor proportions of other substances. The equipment for this purpose is usually arranged in units consisting of a disc evaporator, a rotary incinerator, a double smelter and two dissolving tanks, one for each side of the smelter. There is a serious lack of scientific information on almost all features involved in recovery room operation, and practice today is based almost entirely on what experience has shown to give the best results in any particular installation. We can find no data regarding the heat available or required in the operation nor the temperatures which should give the best results.

Disc Evaporators

The favorite type of disc evaporator consists of a concrete or steel box equipped with horizontal shafts set across the direction of flow of the gases. The shafts carry a number of circular steel discs at right angles to its axis, the diameters being from 6 to 8 feet and the number per shaft being such as to give a total surface of about 2,000 sq. ft. From 2 to 4 of these shafts are used; while it may be that differences in local conditions are responsible for

*Read at the annual convention of the American Pulp and Paper Mill Superintendents Association, Chicago, Nov. 12-13, 1920.



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the following, it seems probable that best results are obtained with three shafts. In an installation of four shafts it was found that liquor of the desired concentration could be delivered more rapidly if the last shaft did not revolve, indicating that after passing the third shaft the gases were saturated with moisture at a temperature higher than that of the entering liquor and that the last shaft was really acting as a condenser.

A three shaft evaporator was able to keep the incinerator supplied with a 30° black liquor concentrated from a 16° liquor whereas under similar conditions, a two-shaft evaporator had to be supplied with 20° liquor to obtain the same results.

The speed of the shafts is not uniform in the several operations, varying from 8 to 20 r.p.m.; as long as the speed is sufficient to prevent caking of the liquor upon the discs and not high enough to cause excessive splashing, there is no evidence that the rate at which the discs revolve has any bearing upon efficiency of recovery. The direction of revolution is such as to keep the liquor moving forward towards the hotter part of the evaporators.

Incinerator

From the disc evaporators, the liquor, as indicated before at a concentration of about 30° Be., flows or is pumped to the rotary incinerator. The sizes of rotaries in use vary over a wide range both in length and diameter and as incinerator operation does not lend itself well to any measurement expressible in numbers, the comparative value of the several sizes is largely a question of the operator's opinions. However, it seems to be agreed that the best sizes are 9′ × 30′, 10′ × 25′, and 11′ × 20′; good results can be obtained with any of these rotaries.

The incinerators are variously lined, some using fire brick in the forward end and others are operated without any lining whatever in the back end. A lining of two courses of ordinary building brick set on edge will stand 18 months' constant operation if well laid, and such service is generally considered satisfactory.

Smelters

The smelters constitute probably the most troublesome feature in all pulp making, and today there is probably no one construction that is decided upon as standard even for one mill; in the rebuilding of almost every furnace, some new features are incorporated which seem to be warranted by experience. There is, however, a certain general type which is quite widely used; this is the so-called "double furnace," which is essentially a single furnace with two feed holes, two outlets and a dividing wall in the center.

The furnaces are about 5′ × 6′ inside and are placed end to end; the dividing wall is about two feet thick, and is built up to about three feet below the base of the furnace arches. The floors of the furnaces are sloped three ways, toward the outlet, with a pitch of about 2 inches per foot. The arches of the furnaces are so located that the top of the arch comes six inches to a foot above the firing floor, giving five to eight feet inside of the furnace under the arch key. The arch used has a radius equal to its span, the key running lengthwise of the furnaces, and is supplied with a feed hole about 12″ × 16″, at about the center of the furnaces.

There is a gap between the arches of the furnaces at the center over which is built a common flue, which conducts the gases to the incinerators. The gap between the arches and width of the flue vary over a considerable range, which is to be expected, as in some installations this superstructure is considered merely as a flue, whereas in others it is built as a combustion chamber. With the long rotaries, best results seem to follow the use of a narrow flue, about 3 feet wide, while with the short rotaries of large diameter, the most noticeable difference is in the life of the flue, which also seems to place the advantage with the narrow flue.

The brick work at the point of delivery from the flue to incinerator is sometimes protected from mechanical injury by surrounding it with a cast-iron collar. This device, by allowing the brick work to be suspended, gives more space for black ash between the rotary and the furnace.

The best material we know of to date for the furnace is a soft, quartz-free soapstone. Walls and floors made of this material, 12 inches thick, last from fifteen months to two years. The arches of soapstone do not last as well, one 8 inches thick giving about 6 months' service, which is 50 to 100 per cent more than could be derived from the same thickness of fire brick, though the latter material is widely used for these arches.

In the flue there seems to be comparatively little corrosion due to chemicals, and fire brick has been found to be immensely superior to soapstone. This part of the smelter is relatively the shortest lived of all, but this seems to be due not so much to the direct effect of the heat as to having its foundation undermined. The side walls of the flues rest on the surface arches near the open ends, where gases turning from the furnaces upward into the flue wear off the edge of the arch and remove the support from under the wall; by keeping the edges of the furnace arches in good repair and by giving the side walls of the flues an independent support by means of a separate arch, such a wall 18 inches thick can be made to give at least six months' continual service.

Air Pressures

The above figures relative to furnace life apply to an operation in which air was supplied to the furnaces under a pressure of 7 to 8 inches of water through three 3-inch water-cooled nozzles. The nozzles, all pointing toward a point in the center of the furnace, were located two in front and one in the rear and inclined downward about 3 inches to the foot, their ends being about two feet apart inside the furnace and about a foot above the floor.

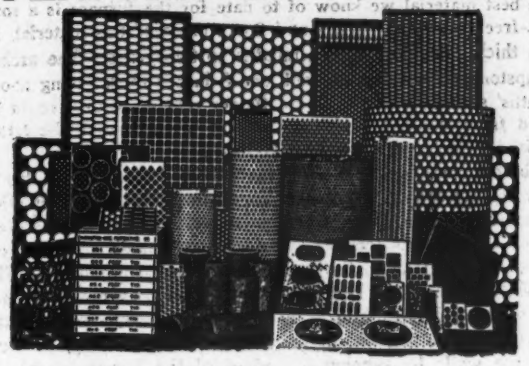
Just what is the relation between air pressure and reduction efficiency, life of furnace, alkali losses, etc., is a question which has not been answered except for individual mills, which have found the pressures at which they can operate most economically.

It seems more reasonable that the rate of air delivery rather than the pressure of delivery is the important feature, for the pressure will be affected by the depth of the fuel bed, obstructions in pipes or nozzles and the condition of the black ash. However, we do not know of any mill in which the air is being metered except in so far as in a mill where the black ash is kept of uniform consistency and the fuel bed at a constant level the pressure of delivery may be taken as a measure of the volume of air blown in.

We know in a general way that on increasing the air pressure within certain limits the capacity of the furnace is increased; that the temperature is increased; that there is less danger of chemicals running out of the furnace unchanged and more danger of the salt cake, after being reduced to sulphide, being reoxidized to sulphite or sulphate; that the sulphide is more apt to be driven off as a vapor and alkali to be carried mechanically along with the gases; that with the higher temperatures so produced wear on the furnaces becomes greater; these things we know in a general way, but we do not know the specific points at which they begin nor how fast they go, and though some plants have worked out their own salvation very satisfactorily, they have found their best operating conditions by their trials and experiences with their own peculiar equipment.

The function of the furnaces is to receive black ash and salt cake, burn off the organic matter, at the same time reducing the sale cake to sulphide and to deliver the molten mixture to the dissolvers. With good operation, 90 to 93 per cent of the salt cake is reduced to sulphide and reduction figures as high as 98 per cent have been noted. As the salt cake has no part in the cooking operation, but is subject to the same percentage loss as the other chemicals, it is important to obtain as high a reduction as practicable.

PERFORATED METALS



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The molten chemicals leave the furnace through an opening at the bottom of the front wall and run in a spout to the dissolving tanks. These spouts are sometimes built of fire brick or soapstone, but for both economy and ease of operation water-cooled iron spouts are preferable.

There is not much of importance to note in regard to the design of dissolving tanks. They are supplied with agitators, a sludge clean-out opening in the bottom and a liquor outlet in front, a foot or so above the bottom. Except that it is sometimes interesting to compare the capacities of several furnaces, which is easiest if each dissolving tank holds enough for one caustic tank, or that the two dissolving tanks of one unit have such capacity, the size of these tanks is not very important. The liquid supplied the dissolving tanks is usually the wash from the caustic room; if for any reason appreciable quantities of lime sludge are returned with the wash, the resultant strong liquor after causticizing is found to settle very slowly; the explanation of this is not evident.

A recovery unit such as has been described consisting of a two-shaft disc evaporator, an incinerator with 600 to 700 square feet surface inside the lining and a smelter consisting of two 5′ × 6′ furnaces with suitable dissolving tanks should be able to receive black liquor at 19° or 20° Be., and deliver green liquor enough for the production of 30 to 33 tons of kraft pulp per 24 hours. The black liquor should supply all the fuel necessary except in starting the fires in the furnaces; where resinous woods are being pulped, the black liquors have a higher heating value, which permits the recovery units to operate on liquors of lower initial concentration.

There is considerable difference of opinion as to the amounts of alkali lost in the furnace room, but it seems reasonable that a considerable proportion of the total losses occur in this department, especially when we remember that the losses in the soda process are very much smaller, though the same equipment and procedure is there employed except in the furnace room; it is true that the majority of soda mills wash the pulp in open pans, but it is very improbable that the losses in such an operation are less than in the use of diffusers.

Except for leaks and spills, due to accidents or carelessness, there seems to be only one way to lose alkali in the recovery room and that is up the stack. Certain data of experiments with a Cottrell precipitator applied to stack gases have indicated that losses through this channel are considerably less than is expected from the above comparison with the soda process, but these data were neither authentic nor complete.

Causticizing Room

The causticizing room is equipped with 5 or 6 tanks of the same size and construction, the number depending upon the number of times it is desired to wash the sludge. Each tank is supplied with an agitator, a sludge clean out, a basket for the lime and a swing pipe for drawing off the clear liquor.

The best method of removing the alkali from the sludge is by a progressive washing. In an installation fitted with six tanks, the first wash was sent to the dissolving tanks, a second wash for making a first, a third for a second, and a fourth for a third; the fourth being made with water. This system gives ample time to wash the sludge out of a tank after the fourth wash has been drawn off.

There is no special reason for sending a strong wash to the dissolving tanks, and so it is the practice in some mills to use a very strong solution for causticizing and then mixing the first wash with the clear liquor before sending it to the digester room.

The concentration at which the green liquor is sent to the causticizing room varies in different operations from 16° Be. to 24° Be., the proper strength depending upon local conditions; the same applies to the amounts of lime used per unit of alkali. A dilute solution and an excess of lime mean a higher percentage causticity, but they also mean more water to evaporate, larger storage tanks and a higher lime bill; on the other hand, incomplete causticization involves the carrying around of quantities of sodium carbonite, which is inactive in cooking, but suffers the same shrinkage as the other chemicals.

It is considered good practice to causticize a 20° Be. liquor, using 50 to 60 lbs. of lime per 100 lbs. of sodium carbonate. This will give a white liquor of about 83 to 85 per cent activity (activity being caustic plus sulphide divided by caustic plus sulphide plus carbonate) which is generally acceptable; this represents a lime consumption of about 600 lbs. per ton of pulp.

The causticizing is done at a temperature of from 90° to 95° C. this has been found to give as good results as at a higher temperature, and minimizes the danger of boiling over and scalding the operators.

The time that the agitator should be kept going and the time which should be allowed for settling depends upon the quality of lime available and must be determined by trial, as chemical tests are of little aid in foretelling these factors, except in such general terms as that a high purity calcium lime with little iron or magnesia should be used, and that as far as possible air-slacking should be avoided, as air-slacked lime contains a considerable proportion of finely divided calcium carbonate, which not only is valueless in the chemical reaction of causticizing, but its presence retards the rate of settling.

Theoretical considerations indicate that tall tanks of small diameter should be used for settling, as they would speed up the settling and permit a sharper separation of liquor and sludge, but since tanks 14 feet in diameter by 10 feet high can be operated with a loss of less than one per cent of the alkali, it is quite probable that questions of space, floor levels, metal, etc., should be given first consideration.

General

The proportion of chemicals used in one digester charge which passes through the recovery cylinder and is returned to the digesters for reuse, expressed in per cent, is the percentage of recovery. As the total quantity of chemicals in circulation should be kept constant, the quantity of salt cake (and soda ash, where it is used), required for this purpose are then the equivalent of the losses; the losses per digester charge expressed as a per cent of the total chemical charge and subtracted from 100, is the usual way of estimating recovery. Eighty per cent is considered good operation, and while recovery over 80 per cent is being obtained, lower figures than 80 per cent are more common.

In cost accounting, the salt cake consumption is usually reported in pounds per ton of pulp made, but this figure is not the equivalent of per cent recovery because the chemical charge per ton of pulp varies as much as 50 per cent in various mills, depending on the time allowance per cook, steam pressure, grade of pulp, etc., which makes it entirely possible that a mill recovering 80 per cent may use more salt cake per ton of pulp than one in which only 75 per cent recovery is being realized.

In considering recovery as a whole, there are, besides a mass of details and special features, two main principles involved; first, prevention of dilution, and second, prevention of losses. Of the two, the latter is the more important, and except for the minor and more obvious ones, the causes are harder to detect and remedy. This is especially true in regard to the furnaces where there is today probably the greatest room for improvement.

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DIGESTER LININGS *

By A. F. Richter, of the Stebbins Engineering Co., Watertown, N. Y.

A review of the history of the development and success of the sulphite pulp industry, following the discovery of the process, shows that same has depended upon the lining of the digesters to a greater extent than upon any other factor.

Discovered by Tilghman in 1866

About 1866 Benjamin Tilghman, of Philadelphia, discovered and afterward patented in Great Britain and the United States, the sulphite acid solution process for converting wood pulp suitable for making paper, and it was claimed for this process that more plentiful and cheaper materials could be utilized and a greatly superior product produced that was possible by the alkali solution, or other processes then known and employed.

To properly carry out either the alkali or sulphite process, so-called kettles, boilers or digesters, differently named, but in reality one and the same thing, are required in which to boil the solution and cook the raw material. In order to facilitate the speed of cooking, but more particularly to provide for the proper reduction of the raw material into fibrous pulp, the use of steam and its equivalent temperature under pressures ranging from about 50 to 100 pounds per square inch is required, and the same forms a very important part of both the alkali and acid processes. But, unlike the alkali solution, which is non-corrosive to common metals, the acid solution of the new process proved itself to be a very active corrosive agent which rapidly destroyed the iron or steel metal of the digester shells and the metal parts of other appliances required for carrying out the process. To overcome this adverse condition, Tilghman covered the interior of his metal appliances with an endless and unprotected coat or lining of lead, the latter metal being the only one of the cheaper abundant metals that will successfully withstand the corrosive action of sulphite liquors.

The use of lead by Tilghman proved satisfactory in protecting only such steel and iron appliances which were required to be operated at or near normal atmospheric temperature, but in the case of the steel digesters the lead soon became defective and useless and these defects were produced or caused in several unavoidable ways: (1) The high temperature maintained within the digesters, causing a wide difference in the range of the expansion and contraction of the metals employed. (2) The operation of digesters under temperatures varying during each cooking period, from atmospheric temperature to about 320 degrees Fahr., caused a constant stretching and contracting of the metals. (3) The soft yielding nature of the lead, operated under the high pressure maintained within digesters, caused the lead to creep, causing buckling or blistering of the lead.

All of the above causes combined resulted in the lining quickly losing its elasticity, thus becoming brittle and failing in its purpose by cracking, and thus at the start or early stage of the sulphite process, Tilghman was confronted with a problem which, as shown by subsequent events, even his well-known skill and ability failed to solve, and due to this failure more than to anything else, the sulphite process practically went out of existence for several years.

Claims Proved and Verified

While these difficulties and consequent loss of financial support caused Tilghman to abandon the further development of his process, he had succeeded in keeping it in practical operation long enough to prove and verify his claims, that the sulphite process would produce a superior product from cheaper material than was possible by any other process then used. This fact seemingly furnished the incentive and formed the basis for others to take hold and build up the process, and so, at the end of some eight or ten years after Tilghman's failure, the sulphite process had been developed by several firms or persons in France, Austria and Germany, to a point where its commercial success seemed reasonably well assured. But again and for several years thereafter, sulphite pulp manufacturers resorted to the old method of lining digesters with sheet lead, excepting that at various times over a long period, many new devices and contrivances for holding the lead lining in place were invented, patented and tried out, for the purpose of overcoming the defects before mentioned, but all of these efforts were entirely wasted, for the reason that comparatively no progress was made in increasing the life and efficiency of the lead lining, consequently, for the second time, the sulphite process hung in the balance between success and failure, with the odds in favor of the latter.

In the meantime, several inventors seem to have reached the conclusion that as nature had provided a fixed and wide difference in the expansive and contractive characteristics of the steel and lead with which they were dealing, it was a useless waste of effort to further endeavor to make these powerful forces of nature harmonize and work together as a unit, and they accordingly turned their knowledge and skill toward other and more likely possibilities.

Considerable Experimenting in Early Eighties

During 1881, 1882 and 1883, considerable experimenting was done in France, Germany and Austria with a form of lining intended as a support and protection to the lead linings as heretofore installed.

The first to discover a successful substitute for use in the place of lead linings was Maurice Emile Pierredon, to whom a patent was granted for his invention by France, March 31, 1883. This invention consists of applying directly upon the interior surface of the steel digester shell a heavy coat or lining of Portland cement mortar, and into this mortar there was set a supplementary lining of anti-acid stone blocks.

The following is a list of the principal cement digester lining patents in the order of the dates upon which they were issued:

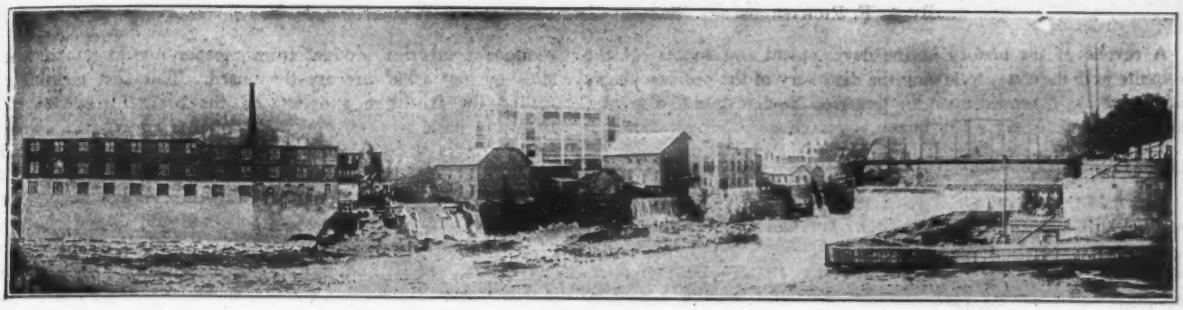
1. France, to Maurice Emile Pierredon, March 31, 1883.
2. United States, to Alexander Mitscherlich, November 4, 1883.
3. United States, to Alexander Mitscherlich, March 9, 1886.
4. Austria, to Joseph Monier of Paris, August 24, 1886.
5. United States to Schnurmann & Glose, April 5, 1887.
6. Austria, to William Wenzel, May 27, 1888.
7. Germany, to Jung & Lindig, January 22, 1889.
8. United States, to Reynolds, March 18, 1890.
9. Germany, to Jung & Lindig, October 15, 1890.
10. United States, to G. F. Russell, January 27, 1891.
11. United States, to G. F. Russell, reissue, November 15, 1892.

Pierredon's Patent

Re French patent granted to Pierredon, March 31, 1883, he states: "The process, which consists in dissolving the incrusting matters contained in woody and textile substances, by means of sulphurous acid solutions, has been up to this time impeded, by the frequent repairs to the boilers in which the cooking is carried on."

"There has been employed the most frequently for the construction of these digesters, plates of iron or steel provided on the interior with a lining of lead, but the difference in expansion

*Read at the convention of the American Pulp and Paper Mill Superintendents' Association, Chicago, November 12-13, 1920.



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existing between the iron plate and the lead, tending to put out of shape the interior lining, the lead is torn away after a few operations and no longer protects the iron plate from the corrosive action of the cooking solutions."

"In order to avoid these disadvantages, we employ a digester of iron plates, lined on the interior with a structure of square blocks of stone or bricks, preferably volvic stone. These square blocks are set into mortar of Portland cement, which fills the joints up to about half their height, the rest of the joint is filled afterwards by melted lead, in such a manner that there is in contact with the acid liquor only acid resisting materials.

"The thickness of the joints of lead is such that the expansion of the lead, which is very great, added to that of the stone, which is almost nothing, is practically equivalent to that of the iron plates of the digester."

"We claim in conformity at law, the exclusive working of our system of construction of apparatus designed for the disintegration of woody and textile substances by sulphurous acid solutions, in the preparation of paper pulp."

"This system is carried out according to the conditions described in this statement, having regard also to the annexed drawing; it is optional for us to vary the forms and dimensions of its constituent parts."

It is worthy of record here, that Pierredon was the first to recognize the practical features which control the success of any digester lining installation, and it is a most important fact that his patent was granted seven months previous to the one obtained by Professor Mitscherlich for a lead lining supported in place by an interior lining of brick work.

The chief difficulty which Pierredon met with was that the lead joint would creep, exposing the cement to the destructive action of the acid solution. The use of lead for joint material was entirely abandoned and subsequent linings were installed with various kinds of cement compositions, none of which proved entirely acid resisting, and these linings were kept in service by regular and frequent repointing of the joints.

Pronounced Improvement in 1895

The most pronounced improvement was accomplished by the introduction of the litharge composition joint, first attempted in 1895, but the proper method of proportioning the materials and applying them for this purpose was not reached until 1906. Since this date, the litharge joint, or more properly named, glycerate of lead cement, has been the accepted material employed for laying up the face course brick lining.

It is now universally understood that in order to install a cement and brick lining which will give the best possible results in service, it is necessary to have a rigid digester shell, which will not slip or give at the riveted seams upon application of temperature and pressure strains. It is also understood that age improves the lining, this being chiefly due to the cement having obtained its final set.

Tensile Strength Tests

The following tensile strength tests were made by General Gilmore, U. S. A.: Portland cement one part and sand one part, compacted in moulds, shows a tensile strength of 134 pounds at end of 15 days; 144 pounds at 42 days; 223 pounds at 135 days and 984 pounds at 320 days.

These tests are interesting, inasmuch as it has been demonstrated in practice that the resistance of cement to the corrosive action of the acid solutions employed in cooking wood, increases proportionately with the increase in the tensile strength.

Proper Thickness of Lining

The question of the proper thickness of a lining, which will displace the least possible space inside the digester shell and at the same time afford the greatest possible protection to the shell itself, is an important feature, which should be taken into consideration. This depends on two important points. 1st. The temperature and pressure to be employed in operating the digester; 2nd, upon the non-radiating qualities of the materials selected.

It is generally acknowledged that a lining which is a good non-conductor of heat may be thinner than one which permits the temperature of the steel shell of the digester, under full pressure, to advance above 135 degrees Fahrenheit. For digesters of 11 to 12 feet diameter the thickness may be 5½ to 6 inches, and increased to 7½ inches thickness for digester having 17 to 18 feet diameter.

Proper Care of Digester Linings

The proper care of digester shells and linings has been neglected as the feeling of security grows. In the earlier days of the industry, the natural anxiety of the mill owners and superintendents concerning the safety of their plant equipment, caused them to guard their interests by very close attention to such details as the temperature prevailing in the building containing their digesters. Serious explosions have resulted from exposure of a hot digester shell to a current of cold air blowing directly upon the shell while the digester was in operation, causing loss of life and heavy property loss.

Quite recently a new digester was put into operation and started very successfully, the lining proving to be tight. The shell had been subjected to a hydrostatic pressure of 185 pounds per square inch, and remained dry under that pressure. After this a steam pressure of 105 lbs. was applied and the shell proved tight at this pressure, also failed to show any slip at the riveted seams.

It was then decided to paint the new digester shell, and the workmen, finding working conditions rather warm, decided to be more comfortable, whereupon they opened all the available doors and windows and when the whistle blew for quitting time they went home, still leaving the digester exposed to the cold air. During the night the weather changed and a considerable drop in temperature occurred, causing excessive contraction strains to be applied to the new shell when under full operating temperature and pressure, and this terrific strain caused the riveted seams to give slightly. After the weather turned warmer during the following forenoon, the steel again warmed and expanded to its natural position, showing leaks.

This is a very convincing argument in support of a recommendation that the American Pulp and Paper Mill Superintendents' Association adopt measures directed toward a safety first campaign applied to handling digesters.

American Co. Starts New Mill in Canada

A strong American company operating at Buffalo, N. Y., Skowhegan, Mich., and Penn Yan, N. Y., under the name of the Niagara Wall Board Company, is establishing a branch of its business in Cornwall, Ont. A new Canadian company, the name of which will be the Cornwall Pulp and Paper Company, is being incorporated, and the mill premises of Ross & Co. have been leased, with an option to purchase. E. E. Emigh, of Richmond, Va., will be in charge at Cornwall, and is already on the ground. Arrangements are under way for water supply from the canal through the Department of Railways, and the Street Railway Company have been asked to put in a siding. The company manufactures groundwood and turns out heavy specialties such as wall board, beaver board, etc. The plans of the new enterprise contemplate continuous operation with a staff of about thirty and an annual wage roll of about $50,000. As soon as the buildings can be put in shape and necessary equipment installed manufacturing operations will commence.

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YIELD OBTAINED FROM COOKING WOOD*

By J. A. Bowers, Hammermill Paper Co., Erie, Pa.

When I was first asked to prepare a paper by Mr. Massey I tried to renig on account of being at the time almost overwhelmed with work, but he is so persistent that you cannot put him off, and finally I had to agree, providing he thought you could stand it, to talk from what notes I could gather together on the subject of the "Yield Obtained from Cooking Wood." Nearly all of my data concern sulphide cooking. I presume a good deal of it will apply, however, to any process of manufacture. I have not taken any time for preparation, and I am somewhat in the position of General Ludendorf, of whom this story is told during the late war.

It was the custom in a small village in Germany during the war, where they had no daily distribution of newspapers, for the people to gather at the post office at the time the mail was distributed, and get their papers. They were much concerned, as the rest of us were, over the outcome of the different battles. One day two old men of the village opened their papers, and they were confronted in cold type across the first page with the words "Ludendorf in statu quo." They looked at one another, and finally one of them got up courage enough to admit that he did not know what it meant, and he asked the other if he knew. The other man did not know what it meant, either. They finally agreed that they would wait until the postmaster was through distributing the mail, and then ask him about it. He was, of course, the typical all wise postmaster of the village town, and when they handed him the paper and asked him, he had to give some answer. He looked at it a while, and then he said, "Well, that means that Ludendorf is in a hell of a fix." (Laughter.) So that is about my position now. I am supposed to give you something without much preparation.

Saving Sulphur

One of the questions that was put to me at the time I was requested to do this—I do not know just who this came from now—was in this connection: Inasmuch as wood has become so valuable, might we not raise the question of the saving and obtaining of a higher yield at the expense of sulphur. In all of my experience I must emphatically say that if you save the wood, you will save the sulphur with it. That is natural in all the chemicals that go into the manufacturing process, up to the bleaching. If you can get a higher yield from your wood, you also will obtain a lower consumption of your sulphur, limestone, lime or whatever you may be using. The different elements that enter into the question of just what yield you should expect, and what will cause variations in your yield, are very numerous. I may possibly repeat myself during this short talk, and I may repeat some things that probably are not new to you. But if I do, I do not wish to make any apology whatever, because I am a strong believer in repetition. We are told quite frequently by the president of our company a little story to illustrate that. He had one of our young men come before him at one time with a proposition which sounded very good to him, and he asked the young man to meet with the directors a few days later on and explain the proposition to the directors. At this meeting the young fellow fell down completely, presumably because he was a little scared at first, and also because his personality had something to do with it. He was afterwards taken to task by our president, who said to him, "You fell down completely. Why is it you could not give this proposition to the directors today the same as you gave it to me the other day?" The young fellow replied, "Well, I don't believe in repetition." "Why certainly you believe in repetition. I can prove it to you." "How?" "Why, you have three children."

Yield Based on Cubical Content of Digesters

You may obtain a yield from your digesters, based on the cubical content of those digesters, first, with a variation of from about 3.9 to 4.7, and possibly 5, pounds of pulp per cubic foot of digester space. Or your figures may vary from about 410 to 480 cubic feet per ton of pulp. These variations are caused by things sometimes that are beyond our control, but mostly that are within control. I would like to give a few of the causes of some of these differences in yield.

They will vary, first, with the wood—that is, its size, its kind and its nature. One of the things in the size of the wood which has a material effect upon the number of cords required per ton of pulp is the length of the wood. There is quite a difference in the solid content of a cord of wood delivered in two, four, eight or twelve foot lengths. I think I have those figures. One cord of two foot wood contains 2 per cent more wood than four foot would. One cord of eight foot wood contains 6 per cent less wood than in four foot lengths. One cord of twelve foot wood contains 12 per cent less wood than in four foot lengths. That is quite an item, if you are trying to check up your cost figures to find out when you have a low yield at the end of the month, to find the cause, and it may lie in the difference in solid content of your cord of wood. I presume that there is hardly one of us here who has not handled wood through his process, and it is persumably well known as to the difference of yield obtained from balsam and hemlock. There again it will depend upon how the wood is measured, whether it is measured in the form of slabs, split wood or round wood.

Soundness of Wood

Just in passing I will touch upon the difference in yield on the soundness of the wood. I presume you all heard the talk that Dr. Kress gave on fungi in both wood and sulphite pulp. It is an enormous loss through this one condition of the wood.

Where Losses Occur

Going on now to the step in the process of manufactured pulp, or the first process through which wood passes in order to convert it into pulp, we have a loss first on our saws of sawdust. There is a further loss in the shaker screen, both sawdust and fine slivers. There is, too, a further and perhaps greater loss in the cooking, if we are not careful to have uniform chips delivered to the digester.

In the barking of wood over a number of years with very careful records you will find that the bark itself is about 12 per cent of the volume of the wood. This figure is on the general run of wood running probably from three and one-half to ten inches in diameter. This barking loss you will have if you are rossing your wood according to modern methods with some kind of barking device. This may be increased to 35 per cent by knife barking methods.

There is one loss which no one should have in their mill and that is a loss—this is almost a criminal offence to have a loss of this kind—that is a loss of manufactured, finished fibre. In this connection I would like to make an appeal to those of you who do not obtain careful records of the losses that take place throughout your mill. You will be surprised and you certainly will benefit thereby if you will try to get some of these figures. No one set of figures will apply to all mills.

*Read at the convention of the American Pulp and Paper Mill Superintendents' Association, Chicago, November 12-13, 1920.

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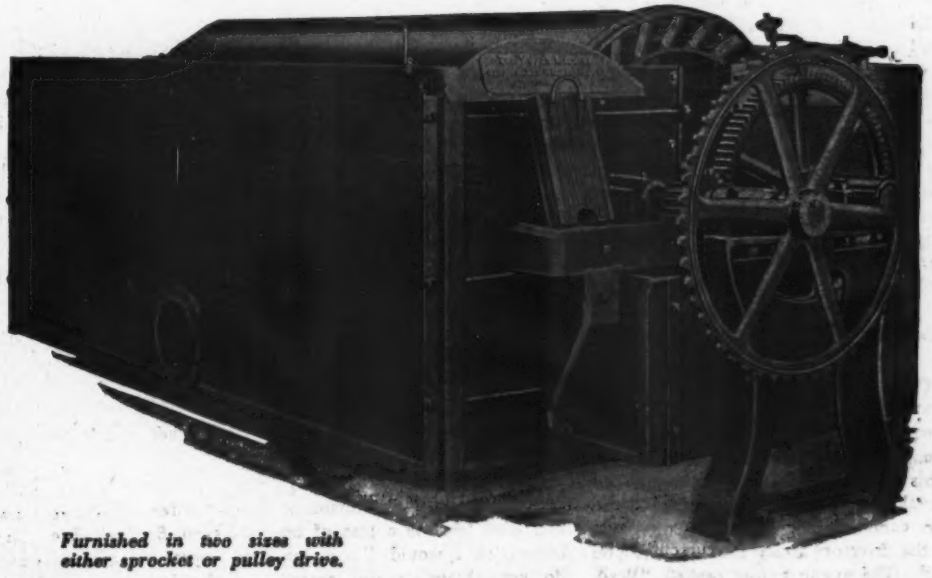

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RECLAIMING OF ACID*

By O. L. Berger, T. D. Jenssen Co., New York.

Your secretary has again asked me to read a paper on acid making, and as I have before taken up the manufacture of "System Acid," I am today going to say a few words about "Reclaiming."

Some Statistical Information

First, it ought to be of interest to get a few figures along statistical lines, on the sulphite industry.

Today there are about 130 sulphite mills either in operation or under construction on this continent, and when they all are running to full capacity there will be produced about 9,000 tons of sulphite each day; 6,000 in the United States and 3,000 in Canada. These sulphite mills will then consume some five and a half million cords of wood, 350,000 tons of sulphur, 300,000 tons of limestone, and 80,000 tons of lime, annually. Seventy per cent of this sulphite is made with acid from tower systems, and thirty per cent by milk of lime systems, and nearly half of all this acid is made by Jenssen towers.

The Secret of Reclaiming

The definition of the word "reclaim" is "to call back from error," and how very true this definition is in our business is known by all. What is generally understood by "reclaiming" in a sulphite mill is the art of cooling the relief from the digesters and causing it to be absorbed by the system acid, thereby building up the strength of the cooking acid and at the same time causing a tremendous saving of chemicals.

The first manufacturers of sulphite pulp did not understand the secret of reclaiming and relieved the digester into the atmosphere, killing all vegetation around the mills and making the work anything but pleasant for the operators.

One of the first attempts to carry out a systematic reclaiming was done by Dr. Drewsen in Norway, and as I have mentioned in a previous paper, was introduced by him in this country about thirty years ago. I am told that previous to the installation of the Drewsen separator it was customary to use five hundred to six hundred pounds of sulphur per ton of sulphite, and when we know that today many mills use as low as two hundred pounds per ton, and some in Europe as low as 190 pounds, it can easily be calculated what economic value this invention has had for the sulphite industry.

There are no two mills relieving their digesters the same way, but all have, of course, a period of wet and dry relief. The original Drewsen patent utilized a separator. This consists of a brick lined steel tank in which the liquor is taken and forced to give off its free SO_2 which is piped from the top of the separator back to system acid, while the remaining liquor is taken off at the bottom, either to the acid storage tank or the sewer. Many mills still use the separator, especially those making high grade easy bleaching pulp, while the average quick cook mills have discontinued the separator and blow back all liquor to the tanks, where it is mixed with the fresh acid. If a separator is used a nearly clear cooking acid is obtained, while in the other way a somewhat darker acid is the result. It is generally found that less sulphur is used if all liquor is reclaimed, but on account of the retarding effect of the dark liquor somewhat more bleach will be needed in case the separator is not used.

Most Common Relief Cooler

The most common relief cooler is the counter-current type using horizontal lead pipes submerged in the cooling water. There also are other coolers used, namely, the Thorne Beehive, the Wolf and the Pelley, all of which take less room and are more efficient in water consumption. The counter-current cooler is generally figured at 20 square feet per ton sulphite, while the others probably do not use more than ten to fifteen. The relief cooler should be built of as small pipes as practicable so as to get the relief in close contact with the cooling surface. If very small pipes are used, however, there is always a possibility of plugging by chips in case the strainers should happen to break. The relief must be cooled as well as possible so as to be easily absorbed by the fresh acid and not heat the same.

In case only one relief cooler is used for several digesters it has been found that back pressure will occur in the relief lines, which tends to hold back the relief of certain digesters, thereby delaying the cooks. For this reason it seems advisable to use a separate cooler for each digester, and many mills which have adopted this scheme report great improvement in their cooking conditions, as the cooking time can be accurately predetermined and uniform results obtained in the grade of pulp.

Two Methods Generally Used

There are two methods gerenally used for absorbing the relief in the fresh acid, namely, by the use of the reclaiming or recovery tower, and by blowing directly into the tanks. Where a very high acid is wanted it is advisable to use the tower, while with dry wood, and if a sufficient depth of acid is assured an acid of 5/4 and 1 can easily be maintained by the latter method. In either case the excess gas which is not absorbed by the fresh acid is piped up to the acid system so a perfect cycle is assured. There is no loss of SO_2 in either case, but by the use of recovery tower more of the free SO_2 from the digester is retained by the fresh acid, thus building it up higher in total and free, while, by blowing back directly in the tank, more of this SO_2 is returned to the acid system.

If the relief is blown into the acid tanks it is important to arrange an efficient distributing system in the tank, breaking up the gas in fine bubbles, and obtaining a high column of acid for absorption. This is often done by the help of an elaborate system of horizontal perforated pipes laid on the bottom of the acid tank. This is very efficient, but there is a danger of delays in case of repairs, as the tanks often must be emptied before repairs can take place. For this reason it is advisable to go down into the tank or tanks with several pipes through separate manholes and arrange a small distributing cross at the bottom of each line, taking care to make this cross small enough so that it can be lifted out bodily through the manhole. Personally I have found this very efficient and a great time saver.

Types of Recovery Towers

There are several types of recovery towers in operation, all working on the same principle, which is to pump the acid into the top of the towers and let it be broken up by chercker work, chemical rings, wooden blocks or other inert material as it runs down meeting the relief gas. I ask your permission to mention a special type of recovery tower which recently has come to my attention, and which I am told has been run very successfully for years in certain mills. This is invented and patented by George E. Miller, at present sulphite superintendent at the Interlake Mill in Appleton, Wis. This recovery tower has several coils of lead pipe laid on shelves about two feet apart, over which the acid is broken up. Inside these pipes cold water is circulated and a very efficient cooling is obtained at the same time the acid is broken up by the coils. The gas enters, of course, at the bottom of the tower, and the excess is piped back to the acid system from the

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top. This tower appears to have merits, as it combines cooling and reclaiming and should especially be of interest in case a mill is low in cooling capacity.

I mentioned before that the gas from the top of the reclaiming tank is piped back to the acid system. In case of a vacuum milk of lime system being used, care must be taken not to get too much vacuum in the tank, as this would cause the reclaimed acid to give up its free. It is advisable to maintain a slight pressure on these tanks, and this can easily be done by utilizing a Locke regulator with a large diaphragm working on about a 6" water pressure. When the gas pressure on the tank reaches 6" water the regulator opens up a valve in the line to the system, and as soon as the pressure is relieved the valve is again closed. For this same reason, some mills using tower systems pipe the gas from their tanks to the pressure side of the fan, rather than the suction side, thus insuring a slight pressure on the tanks. Another reason for keeping the acid tanks under a slight pressure is to insure against atmospheric air leaking in and making sulphuric acid and gypsum. With a pressure on the tanks a slight leak is easily detected and generally repaired at once.

It is, of course, necessary to have an air seal on the tanks which releases when the acid is pumped to the digester. This seal should be piped up to the burner gas, if possible, so as to omit atmospheric oxygen getting into the tanks for reasons mentioned above.

Need for Good Acid Tanks

The necessity of having good acid tanks is probably recognized by all, but still it is a pity to see some mills running with leaky tanks, causing all kinds of losses, while a few thousand dollars expended for new tanks would do away with these losses, and more than repay for the installation of the new tanks within a very short time. I prefer an acid tank made of Southern pine with 6" staves and 8" top and bottom. If care is taken such tanks are good for many years, and are absolutely reliable. In the summer time the tank tops should be covered with water, so as to avoid shrinkage from the sun.

Conclusion

In conclusion I want to say that the matter of high or low sulphur consumption is mainly dependent on proper reclaiming. So is also, to a large extent, the matter of sulphuric acid and gypsum in the cooking acid. Today most every mill takes good care of its acid systems and burner gas, but forgets that a grave danger can lurk in faulty operation of its reclaiming system. The reclaiming system is depending on the operation of the digesters, and the maintenance of a uniform cooking acid has a decided influence on the digester operation. So, when everything comes down to facts, it is really up to the cook to make his own cooking acid. Once in a while we run across a sulphite man who does not believe in a low sulphur consumption and claims that the cry about low sulphur can be overdone. Maybe this is right, but when we realize that it only takes about 180 pounds of sulphur per ton to dissolve the lignin in the wood, it does not seem reasonable to use 50 per cent more. I will leave this to the judgment of the individual superintendent.

In giving these remarks on "Reclaiming" I am, as you notice, not trying to expound any new theories or reveal any epoch-making secrets, but just relating my own experiences and observations, and I trust that it will help to bring home to you the importance of this branch of our work, and if possible, bring out the experiences of some others, either in a later paper or in a discussion here today.

STANDARDIZATION OF PAPER AND PRINTING INK*

By F. A. Barmeir, Research Department, American Printing Ink Co.

Ever since I have been asked to speak to you on how the paper and ink manufacturer can co-operate with and aid the printer I have felt that this subject might better have been, how the paper manufacturer, and the ink manufacturer can co-operate with the printer, to the mutual benefit of all concerned. To the best of my knowledge, there has never been a concerted effort on the part of these three industries to get together as industries and study the relations between paper, press and ink. You who are here as representatives of the paper manufacturers have just had your convention. You have undoubtedly discussed many problems dealing with the manufacture of your product. Each and every one of you will go away from here with new ideas which you could have gained perhaps in no other way. The printers of the present, through their typothetæ and craftsmen's club, also doubtless have gained new ideas in their meetings. The ink manufacturers also have their conventions, and I know every one gains new ideas in these meetings. Up to the present time the paper and ink manufacturers have sold their product without attempting to co-operate with the printer as to what would be best for his class of work. They have made no attempt to educate the printer as to the basic materials entering into the manufacture o ftheir product. And it is on this account I believe, especially in the ink industry, that there has been a lack of confidence on the part of the manufacturer in the printer.

Paper, Press and Ink

The meeting this afternoon has brought together representatives of these three industries. Is it not possible that we can devise a plan for systematic study of the relations between paper, press and ink? During the past year some work has been done under the direction of the Grapic Art Society, on the standardization of process colors. That is a step in the right direction. We are all here to gain information.

In a general way I have slight knowledge of the manufacture of paper. There is a lot more I would like to know, so I don't feel that I can come here before you and talk about the faults of paper and how they can be remedied.

There are undoubtedly many things which enter into the manufacture of paper which make it almost impossible for the paper manufacturer to overcome these defects. There are some things he could perhaps do if he was more thoroughly in touch with the troubles that come to the ink manufacturer and the printer. On the other hand, there are many things which the printer and the manufacturer should do and could do if they more thoroughly understood the paper business. It is these things which we can find out only by getting together.

Manufacture of Printing Ink

For the benefit of all, I am going to give a slight description of the principles entering into the manufacture of printing ink.

What does good ink consist of? First of all, it must have sufficient density of color, so that you can use the minimum amount of ink and still get the desired strength of color. Second, it must contain enough material in the varnish of a greasy nature to properly distribute ink on the plates and forms and at the same time enough residual form to bind the pigment to the sheet and get a dry finish at the seat and dry hard. It should set thoroughly into the varnish and carry properly on the press. The

*Read at the convention of the American Pulp and Paper Mill Superintendents Association, Chicago, November 12-13, 1920.

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higher the finish of the paper the less ink you can use. There is, however, a limit to the strength of color which we can obtain in an ink. Therefore, one of the problems before us is, how high a finish can we have on a sheet of paper, so that we can still run enough ink to get the desired color, with the maximum concentration in the ink, without danger of offset? What relation is there between various kinds of sizing of paper, of the same finish, and the amount of ink which can be carried? What relation is there between various kinds of clay coatings and the amount of ink that can be carried? Is it possible for the paper manufacturer to control, within a reasonable degree of accuracy, the paper finish and sizing? Is it possible for the ink manufacturer to control within a reasonable degree, the strength and color of the ink? Is this high finish desirable or would it be better to have a lower finish and reduce the color, the value of the ink? Is it not possible for us to get together and study this subject, with the view in mind of standardizing paper surfaces? Once you standardize paper surfaces your inks will become standard.

I have only taken up the relation of the finish on paper and the density of color. You can see how many other questions would come up if we should go into all the other properties necessary for ink to have.

Printing ink consists of, first, a pigment, which produces the needed color. Second, varnish, which carries that pigment on the plate and form and binds it to the sheet and to the dryer, which makes it dry on the sheet.

Properties of Printing Ink

Any material to be satisfactory as a printing ink pigment must have the following properties: It must have a sufficient density of color to permit, when made up into ink, of using the minimum amount of ink on the sheet. It must be free from grit, so as to grind well in the varnish. It must be of the right specific gravity, so as to stay in suspension in the varnish and give a good body to the ink, without the use of excessive amount of pigment. It must be sufficiently neutral so as to have no effect on the varnish near the pigment plates. It is on this account that the printer has so much trouble with black ink, more than with the other colors. Almost all of the pigments used are what are popularly known as aniline dye colors. They are dye colors made from dye stuffs, which are made from coal tar, intermediaries which are precipitated on a base that is dyed by the dyestuffs in a manner analogous to the dying of silks and wools, the process being entirely different. These various dye colors vary in properties, depending upon the base upon which they are precipitated. Each and every one of these dye colors varies from lot to lot, so it is necessary for the ink manufacturer to watch closely every lot of dye colors and try to compensate for strength in color.

Varnish in Printing Ink

The varnish is the most important material entering into the manufacture of printing ink. No matter what its chemical composition may be, it should have the following properties:

It should contain enough material of a greasy nature to properly distribute the ink on the plate and form, and at the same time should contain enough residual gum to bind the ink to the sheet, give a tack to the ink, so as to print sharp and dry with the finish. It should have enough viscosity so as to give a good body to the ink without the use of an excessive amount of pigment.

Burnt linseed varnish is made from linseed oil, a vegetable oil which has the property of absorbing oxygen when exposed to the air. Other vegetable oils have this same property, and they are being used more and more every day in the manufacture of printing ink.

We have the rosin oil that comes from rosin, and we have varnishes made from other vegetable or mineral oil, which are treated with gum.

Each and every one of these varnishes has its place and cannot in any sense of the word be considered as an adulterant of linseed varnish, because in their place they are superior to linseed varnish. The variation in the physical and chemical properties is not due to lack of care in their manufacture, but is due to the fact that they are all of either animal or vegetable origin, and as such are subject to variation in properties. The role of the dryer in a printing ink is to hasten the oxidation of the oil. Ordinarily linseed oil will dry in about forty-eight hours. Of course, that is too slow, and materials which contain a certain amount of oxygen—in these materials—the materials most commonly used are various salts of lead, cobalt and manganese. In the rosin and mineral oil varnishes, the varnish itself acts largely as the dryer, because the varnishes absorb in the sheet, leaving a certain amount of iron behind, which binds the pigment to the sheet.

Ink and Paper Men Should Cooperate

Let me say to some of the paper men and some of the ink manufacturers, you should co-operate with each other and co-operate with the printer; educate the printer as to the basic materials entering into your business; and to you, Mr. Printer, I want to say, have confidence in the manufacturer of paper and the ink manufacturer; study his problems and co-operate with him, to the end that you may eliminate many of your own troubles.

If it is possible, let us get representatives of these three industries to come together, to devise a system and study the relations between the press men, the paper men and the ink manufacturer.

I would like to suggest that representatives of the following organizations, which are representative of the organizations which have done the most to advance methods of work in their particular lines, be instructed to get together as a committee, to devise a method of studying the differences between the press men and the manufacturers, namely: the Printing Ink Manufacturing Association, the Franklin Typothetæ, the Franklin Association, the Electrotypers' Union, the Engravers' Union, the Retail Paper Dealers, and others. It would be necessary to have this meeting appoint committees to work on this subject—for the others to appoint committees to work and report back to their respective organizations, where the results obtained could be discussed pro and con, and by reaching proved results, spread them out to everybody interested in them. We can never absolutely standardize on paper, ink and the other ingredients coming into the printing industry, but we can at least see how near we can come to approaching the ideal.

We are always going back individually, in our manufactured product, and it is only by standardization that we can hope to become efficient, and it is by standardization of our product that the paper and ink manufacturers can hope to increase their production and to decrease the cost of their material.

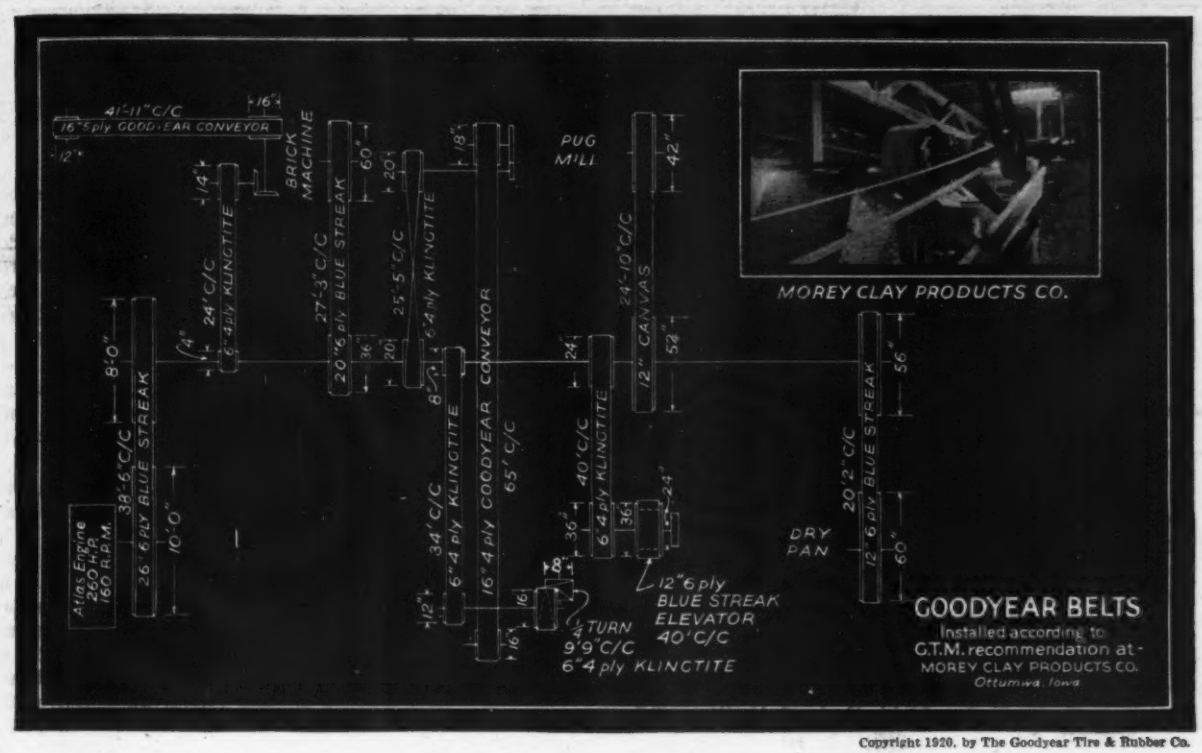
White & Wyckoff Service Club Meets

[FROM OUR REGULAR CORRESPONDENT.]

HOLYOKE, Mass., November 15, 1920.—The November meeting of the White and Wyckoff Service Club, composed of executives, department heads and foremen of the company, was held the past week at the Hotel Nonotuck with a dinner, over 50 being present.

J. P. Fitzpatrick, president of the club, had charge of the meeting and the evening was devoted to problems connected with executive work. George R. Burkhardt, vice-president of the company, gave a talk on the problems that confronted the company in view of the changed conditions in trade.

The meeting also served to introduce James L. Smith, formerly of New Haven, who came to the company this week to take charge of the printing department. Another speaker was F. S. Purrington, who is making an efficiency survey of the plant.



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GOODYEAR

THE RELATION OF AIR VOLUME IN PAPER TO THE HALF TONE DOT*

By N. A. Altmann, Research Dept., Butler Paper Corp., Chicago.

We have chosen a subject for discussion this afternoon about which most people know a whole lot, others less, and still others nothing at all. Yet, I think it is one of the most important subjects to the paper industry if applied correctly and intelligently to certain uses.

With this in view, we are going to talk about certain developments which have come up as a direct result of our experimenting, and although we have not as yet completed our work in an endeavor to find a way of applying this principle to print papers, we know certain relations exist, so we are just going to give you the results, and while we will discuss this application with the paper maker, give a new idea regarding a form for stating analysis of furnishes for the technical man, we want the printer to form his own idea of its value to him.

We know there are possibilities, but it takes years to find this out. We have only been working on it for six months, but we expect to finish the subject in the near future. In our efforts to find this relation, it was necessary to divide the printing sheets to begin with into a rough classificaton as follows:

Classification No. 1—(Those papers containing Groundwood) News, Special Print, M. F. Books of Groundwood basis.

Classification No. 2—(Containing no Groundwood) M. F. Books, S. and S. C. Books, English Finish Books, Laid, Wove, Offset Papers, Eggshells, etc.

Classification No. 3—Containing no Groundwood, but excessive loading materials to improve their printing qualities.

Classification No. 4—All coated papers.

Our next step then was to examine the surface of these printing papers, both with the naked eye, and magnified to 50 diameters. Through this examination, the fact was brought to our attention that when the stock is put over a paper machine all the fibres running on to the wire from the Head-Box do not lay absolutely flat; a goodly proportion of them—which is especially true in the cheap papers—have their ends turned up perpendicularly to the printing surface of the paper. Felting the sheet and getting the correct weight on the press rolls tends to correct this difficulty by squeezing this fibre into the sheet or bending it over. However, no matter how carefully this is done. there is generally a small depression either all around the fibre or on one of its sides.

The idea then is that the fibre is a high point. While this is not so noticeable in the higher grades of paper, it is especially true of news or cheap books. These spaces probably cover an area equal to two or three dots of a 120 line screen. Since these places in the surface do not fall on the same spot all the time, but vary in location in different sheets, you can readily see how difficult it is for a printer to build up his make-ready to take care of these small areas, and still have the impression necessary for good printing just right. The general tendency will be that on the particular area where the fibre is, we will have excessive pressure on the small printing dot, and in the spaces around the fibre the impression will be just right, hence we will find a wearing away of the printing dot under excessive pressure, and except for the first few sheets, poor work will result.

Another finding was the fact that, upon sending a ray of light through the sheet, and magnifying the surface at the same time as above, we found innumerable small holes, some running completely through the paper, others only part way, the size varying according to the grade of paper. The papers shown to print the best having practically none, while those known to print the poorest were full of them, and they were of large size. We also found, since their areas were sometimes larger than several printing dots particularly those of a 133 line screen, that this was another reason contributing to the poor qualities of the paper, for the simple reason that there was nothing but air in these spaces, and nobody has as yet perfected the printing industry so that it can print on air.

These spaces in the sheet occupied by air, we called air volume after the line of reasoning employed in the C. B. S. units which Cross, Bevan and Sindal advanced in England in 1902 to express the bulk and specific strength of papers.

Our reasoning then developed a theory that the printing qualities of a sheet were somewhat dependent upon this air volume, and with this end in view, we proceeded with our work.

To explain this air volume more clearly, we will draw an analogy between a sheet of steel and a sheet of paper, both being the same size and the same thickness. Describing the fibres in a sheet of paper, we will say that it consists of a group of molecules, and we will imagine the same fibre to be found in the steel exactly the same size, but this fibre in the paper for illustration was loosely thrown together and formed in place without any pressure being exerted by the individual fibres towards cohesion. The same fibres in this sheet of steel, however, having mutual attraction and exerting great cohesive qualities instead of being thrown together are naturally pressing against each other with force enough to lose their identity, at the same time squeeze out all of the air between them, forming what we know as a compact mass.

To illustrate this a little more clearly, we will drop this piece of steel into a known volume of oil; the compactness of the mass allows no oil to penetrate into the body itself, and we find the volume of oil displaced by the sheet of steel is exactly equal to the measured volume of the steel itself. Now, if we take the sheet of paper and submerge it into the oil, owing to the lack of cohesive powers of the fibre, we find areas in the sheet into which the oil can run—that is, of course, imagining that the fibre itself will not absorb any oil—and we have when we measure the volume of displaced oil a lesser volume than the actual measured volume of the sheet of paper. The difference between this actual measured volume and the displaced volume of the oil in this case represents the air volume. We can, therefore, say that while a sheet of steel is composed of one volume only, which is equal to the measured volume, we have a sheet of paper composed of three volumes, namely, the volume occupied by the fibres, the volume occupied by the mineral matter, and the volume occupied by the air. The sum of these three will equal the measured volume of the sheet.

The procedure to calculate this air volume in a sheet of paper is the same as that found in Stevens Paper Mill Chemist, and is as follows:—

All our calculations must depend upon the theory that the perfect printing sheet has a section the shape of a rectangle. The printing sides both top and bottom being absolutely regular and straight with just enough give, uniformly distributed to receive the impression without under pressure on the printing surface.

Basing our calculations on the above, we will first make use of a term called "Apparent" specific gravity. By this is meant the specific gravity of the paper as a whole without making allowance for the air spaces. This "Apparent" specific gravity you first determine by the formula, the weight of paper divided by the volume of paper, figures being expressed in the metric system as centi-

* Read at the convention of the American Pulp and Paper Mill Superintendents' Association, Chicago, November 12-13, 1929.

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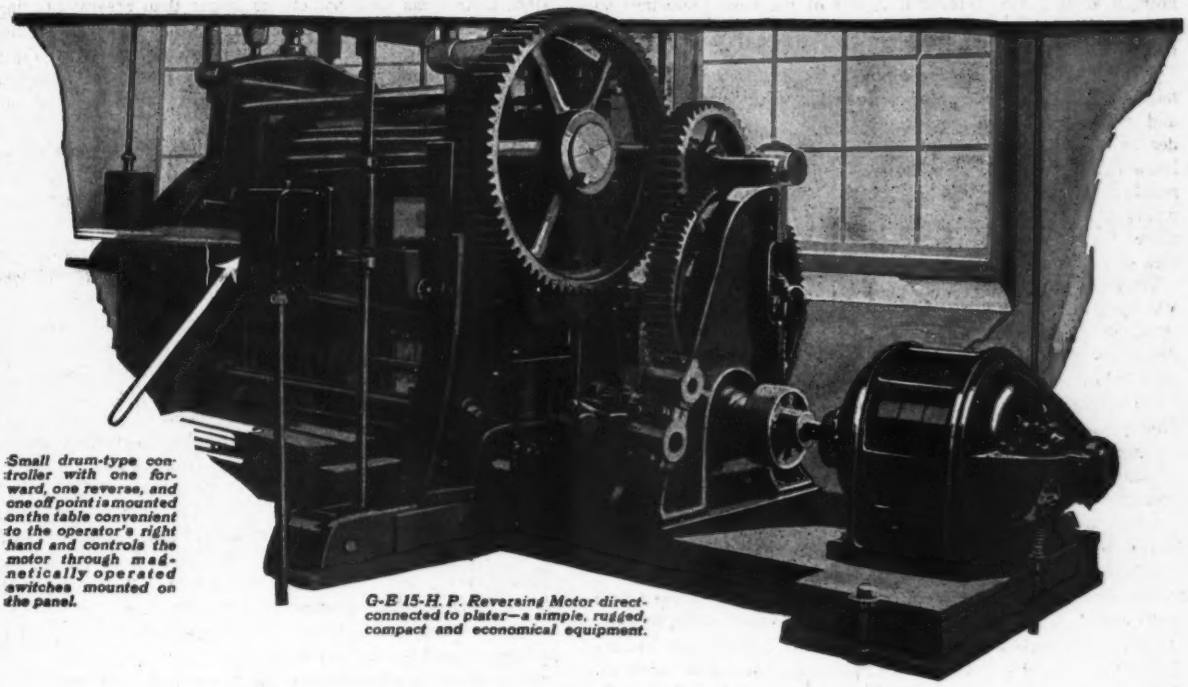

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meters, square centimeters, and grams. It was next necessary to determine the percentage by the weight of the ash of the paper.

The regular procedure for determining this was followed, that is we burned the same sheet from which we calculated this specific gravity, and from this percentage calculated the weight of mineral by multiplying this percentage by the "Apparent" specific gravity, and by dividing by 100. On subtracting this figure from the "Apparent" specific gravity, we obtained the actual weight of the fibre in the paper.

We have now determined
1—Weight of paper
2—Weight of fibre
3—Weight of mineral.

For news print we assumed the actual specific gravity of the fibre contained in the paper to be 1.2; for fibres other than groundwood we assumed this specific gravity to be 1.5; for mineral loading we assumed this specific gravity to be 2.5. To obtain the percentage of volume occupied by the fibres, we multiplied the weight of the fibre by 100, and divided the result by 1.2 or 1.5 respectively depending upon whether the sheet was in Classification No. 1 or not.

To find the percentage of the volume of the mineral, the same procedure as the above was followed with the difference that we divided the multiplication by 2.5, adding these two volumes together and subtracting from 100, which gave us the volume of the air in the sheet.

The greatest care was employed in getting at these figures. Moisture was taken into consideration by allowing the resultant ash to stand for some time under exactly the same humidity and temperature conditions as the original sheet.

Samples were also taken from different parts of different sheets, that is three samples were taken from each 25 x 38-sheet, and sheets taken from different parts of the same run. Same basis weights for comparison were also used, that is we used in our first tests 25 x 38—60 pound.

Our next step then was to determine the air volume for different sheets of print paper, after which it was necessary to examine the paper under the microscope to find out the proportion of fibres it contained.

Classification of Fibres

Before giving actual results on different grades of papers, it would be well to say a word here regarding how we classed the fibres used in producing the papers covered by our four classifications. We have divided the fibres into body or strength giving fibres, and fibres used as filling material. Then, such mineral materials used for loading, sizing, and such mineral and chemical constituents used for coating. By far the most common fibre used for body or strength giving purposes is the fibre produced from the coniferous trees by the sulphite method.

The second most common fibre is the rag fibre. The fibre next in importance is the bleached sulphate. Limited quantities of these latter are used.

By far the most used filling material in the cheaper grades of print paper is groundwood, and we find this material ranges from the coarsest used in ordinary news print, to the refined article used in groundwood M. F.'s, and is known as halftone groundwood.

The other class of fibre used as filling material is soda pulp made by boiling deciduous trees with caustic soda. This fibre is short and the nearest imitation we have to a rag fibre in its softness and strength.

The loading materials most commonly used are talc, asbestine, and China clay.

For sizing we use rosin or starch, a combination of starch and rosin, or a combination of starch and waterglass, all being precipitated by aluminum sulphate.

Among the mineral constituents used as coating materials are satin white, blanc fixe, China clay, etc.

Under the chemical constituents we find casein and the alkali chemicals, such as borax, soda ash, di-phosphate, caustic soda, and ammonia used to bring the casein into solution.

The judicial use of different quantities of the above mentioned fibres, and at times in addition loading material, and then again the coating material, gives us all our different grades of paper mentioned in our four classifications.

Results

Now, to present to you the results of air volume, we have chosen two or more representative papers from each classification, and while we have worked out the air volume for practically every sheet that we handle these particular sheets we know to print well in proportion to the amount of air they contain.

Illustration From Classification No. 1

We first took a sample of Standard News, running around 22 per cent. sulphite, and the remainder groundwood.

Then, a sheet of improved News containing a small percentage of rag and a slightly larger percentage of sulphite, half of its composition being groundwood together with some clay loading. Run rather slowly and carefully.

Next sheet was an M. F. Book containing a small quantity of soda pulp, fairly large quantity of sulphite, very nearly half of its composition being refined groundwood, considerable clay loading and run at considerable speed on a regular Book Paper Machine.

Air Volume for Classification No. 1

News—Standard—The air volume calculation on this was 54.62 per cent.

News—Improved—The air volume of this sheet was calculated at 48.48 per cent.

M. F. Book. The calculation of air volume of this sheet (Groundwood) was 44.08 per cent.

Microscopical Examination of Classification No. 1

News—Standard—Upon examination of the lookthrough under a magnification of 50 diameters, this sheet was found to be full of air holes, and also to have such weak places as described at the beginning of this article.

News—Improved—Under the microscope the surface was fairly smooth, air holes in lesser amount.

M. F. Book (Groundwood). We know this sheet to be able to surface. Lookthrough was fairly solid.

Comments on Classification No. 1

News—Standard—We all know it is impossible to print a fine line halftone on a sheet of news.

News—Improved—We know this sheet will take a fairly fine line halftone.

M. F. Book (Groundwood). We know this sheet to be able to take a 120 line halftone fairly successfully, and the only thing stopping its universal acceptance as a book paper is the fact that it contains groundwood which keeps down its life. Groundwood is not a staple material as it deteriorates very rapidly.

Illustration From Classification No. 2

M. F. At least 65 per cent. of this sheet is composed of sulphite, the remainder being composed of soda pulp, and some loading materials.

English Finish—About 50 per cent. was composed of sulphite, the rest soda pulp. Run somewhat slowly.

S. & S. C.—Same furnish as the M. F., merely sized harder and supercalendered.

It is to be expected that the air volume of the majority of the sheets which are required to do printing work along the same lines as those of Classification No. 2, will have lesser air volume than those of Classification No. 1, due first to the absence of ground-

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wood, second the addition of soda pulp, and third the greater care used in running the paper.

Air Volume for Classification No. 2

M. F.—This sheet contains an air volume of 42 per cent.

English Finish—This sheet contains an air volume of 39.43 per cent.

S. & S. C.—This sheet contains an air volume of 28.92 per cent.

Microscopical Examination of Classification No. 2

M. F.—Upon examination of the lookthrough under the microscope again, this sheet was found to have a fairly good surface, and partial absence of the air volume was noticed.

English Finish—Has a very even surface and the air spaces were less noticeable than in the above.

S. & S. C.—This sheet had very few spaces of air volume and they were so small as to be smaller than any printing dot in existence.

Results

It is a well known fact that any M. F. free of groundwood will print better than any paper in Classification No. 1. We know that this English Finish prints better than the M. F. examined.

We also know that the S. & S. C. under certain conditions prints better than the English Finish or the M. F. and we get here again an idea that the lesser the air volume the finer the printing dot can be.

Under this Classification No. 2 we find Offset Papers. The air volume of these Offset Papers works out in a different way.

Illustration—Offset

We find this Offset Paper had rag, soda and sulphite in it in varying proportions, beaten freely and then run slow.

Air Volume for Offset

This sheet contains an air volume of 55.26 per cent.

Comments

The combination of good fibres, such as are found in this sheet, together with this greater air volume, which upon examination under the microscope was very evenly distributed, that is to say no holes were found in the sheet, and no uneven surfaces, therefore, the air volume must have been evenly distributed around the fibres which is necessary for Offset work.

It is our belief that should you try and print this Offset paper on a Rotary Press with a fine line halftone, you would experience considerable difficulty in turning out good work. The evenness of the surface and the evenly distributed air volume, however, if you were willing to spend time on the make-ready would give you a very fine result, because I have seen some 150 line screens printed on paper of a similar character. However, this paper is best suited for an Offset Press. Here we get an idea that the distribution of this air volume also has something to do with the size of the printing dot.

Illustration for Classification No. 3

Sheet No. 1—This was a sheet containing a high percentage of loading, sulphite fibres in greater proportions, and soda pulp fibres in lesser proportion.

Sheet No. 2—Contained a medium percentage of loading, sulphite fibres in greater proportion, and soda pulp fibres in lesser proportion.

The papers of this Classification should give us a very low air volume, based on the theory that the loading material fills up the spaces around the fibre, and giving us an even surface to print on and a well balanced sheet.

Air Volume for Classification No. 3

Sheet No. 1—This sheet contains an air volume of 26.75 per cent.

Sheet No. 2—This sheet contains an air volume of 30.04 per cent.

Microscopical Examination for Classification No. 3

Under the microscope the holes representing air volume in the sheets were very widely distributed, in fact the size of the hole was much smaller than any printing dot in existence.

Classification No. 4

We are not going into the discussion of air volume on Coated Papers only to say that the tests we have performed here show that this air volume is present in greater or less quantity, depending upon the value of the paper, the same as in an uncoated. However, coated papers can stand a greater quantity of air volume and still print well, because of the fact that the film of coating material is elastic, and there will be no rough edges or sharp breaks due to bunches of fibres, because the coating will form a smooth surface over all. It seems to us that the efficiency of the coating material really is proven by the air volume, because the better the coating is put on, the less air volume we will have, due to the coating filling up all these small, minute, unoccupied spaces within the sheet.

Summary of Results

The tests performed here have been performed on the basic weight of 25 x 38—60 pound. We have not completed all the heavier weights of these different papers, but we know from the records that we do have that the air volume decreases slightly as the sheet becomes heavier.

In the first place, the air volume if worked out truthfully will give the paper manufacturer and the paper dealer some idea of what his sheet is. For instance, if he has produced a wonderfully good printing sheet, it is our estimation that he has a better chance to control this sheet at each subsequent run by knowing whether the air volume is the same or not. Every paper manufacturer makes an ash determination of his Book Papers. Once this is determined, it is an easy matter to calculate the air volume. From what we have seen and the results we have had in our laboratory, it seems to us that it could be worked out as a control of the paper going over the machine. This would tell him innumerable things, under which would be whether his raw material was the same, whether the formation of the sheet was the same as in previous successful runs, etc., helping him to standardize his papers and cut down complaints. It seems to us that it is of value to the paper merchant, because it enables him to compare different grades of uncoated print papers as to the consistency at which this paper is being run, by examining different runs.

We have applied this theory as follows in our laboratory, and although we realize it is not developed far enough yet to be able to say that if this Print Paper had a certain air volume it is an M. F. or Eggshell, etc., we can do this: If we take a sheet of M. F. for instance, free of groundwood and we know this sheet has been printed successfully under certain conditions of temperature, humidity, and inks, we make a microscopical examination of this, note carefully the percentage of fibres, determine the sizing used, and then calculate its air volume, and also, if possible, take a photomicrograph of its lookthrough, file this away, and when the next lot of paper is manufactured go through these tests on the next sheet, and if they appear within a reasonable percentage of difference you can rest assured that under the conditions which have not been varied greatly the paper will do good work.

The proposition for the technical men is one which has troubled us a lot and which we think can be solved by air volume. When we make an analysis of a sheet of paper, we have a heading which we call approximate furnish. Under this, we will head the following items:

Sulphite	61	per cent.
Soda Pulp	39	per cent.
Rosin Size	1.2	per cent.
Alum	3	per cent.
Clay	11	per cent.

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WATER FINISHED AND
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SULPHITE AND GROUND WOOD PULP

SHAWANO WISCONSIN

The average human being not understanding these terms adds up the total percentages, and he has more than 100 per cent. This confuses him very much, and at the same time does not tell him anything about the correct proportions of these materials in the sheet itself. Therefore, we take the liberty of advancing the following form of table which we intend following in our laboratory.

		Sulphite	61 per cent
		Soda	39 per cent.
	Fibres	50.74 per cent.	
		Rosin	12 per cent.
		Alum	3 per cent.
		Clay	11 per cent.
M. F. Book	Mineral	6.95 per cent.	
		Per cent. of Mineral Impurities of fibre.	
	Air	42.31 per cent.	
		100 per cent.	

You will see in the first column the name of the paper, for instance, M. F. Book; the second column gives percentages by volume of fibre, mineral, and air. This will always total 100 per cent. In the third column we find the percentages of the different fibres composing the percentage of volume of the fibres in the sheet. We find the same thing applies to the percentage volume of mineral. This in our estimation at once gives a comprehensive idea of a sheet of paper.

In these foregoing statements lies the value in our estimation of this entire work as far as we have covered it. From this, and with other experimentation we expect some time to be able to find a technical test for Print Papers also.

To help the printer form his own idea of the relation of air volume, we will review the ideas presenting themselves during our experimenting which are that the better the quality of materials, the greater the care used in manufacturing the use of filling or loading materials by the paper maker will cut down the air volume of a sheet so that the printer can print a much finer dot, also the air volume should be very evenly distributed. Then, when his opinion is formed it may help him considerably in getting the right paper for the particular conditions presenting themselves by a certain job and thereby getting 100 per cent. results.

You may rest assured that this has by no means been completed from a printer's standpoint as far as we are concerned, but we expect in the near future to give him some definite statements that will materially help him in his work.

SERVICE EXPECTED BY BUYERS OF PRINTING*

By Christen Olson, Superintendent, Manz Engraving Co.

I am here, according to the program, to talk on the service expected from the printer by the customer, and how the paper manufacturer and ink manufacturer can assist in accomplishing this object. Any one who has had dealings with a customer on printing, already knows what is expected better than I can tell, so there is little for me to tell those who, like myself, are engaged in this branch of the work. I take it, then, that my message will be to those who are engaged in the paper and ink manufacture, or those who are not thoroughly familiar with the expectations of a printer's customer.

Right Kind of Result Expected

In trying to tell you of the service expected, I think it is best to consider the finished product as delivered by the printer to his customer. My experience has been that the customer only expects one result and service, and this is the right kind of printed matter, that will so picture his wares or commodity that he in turn can dispose of them, or advertise them, or, in fact, sell them, without actually showing the merchandise itself. He expects the printing to be such that it will be the means of increasing his business at a lower cost than in any other way. In short, he expects service that will net him financially.

I think it best to put it in this way, because we always find more satisfaction to all concerned if a customer realizes on his printing financially. To accomplish this service, the printer must help his customer in many ways, particularly in preventing him from entering or undertaking to produce printing that is not practical.

Among the practical superintendents, this condition, I believe, is generally understood, and when a man like myself has given this service to the customer, and through his knowledge of printing rendered the customer a service, on which he can realize, making it practically compulsory for him to continue the use of his class of printing in the conduct of his business, it is my opinion that such a superintendent of printing has made good.

Further, if a printing superintendent must give this kind of service to his customer, he in turn has the right to ask that this same kind of service be given him by the paper manufacturer, or the paper mill superintendent, as well as the ink manufacturer.

Also, if it is this kind of service, that the customer of the printer requires, and if, in turn, the printer looks for this service from the ink and paper manufacturers, it should then be the aim and object of the combined industry to so plan that the printed matter will be a necessity, especially in increasing the business of our good customers, as well as increasing our own business through our efforts.

Mutual Problems

Before I tell you how the paper and ink manufacturers can assist the printer, let us consider where we stand. Are we a combined industry? Can we depend upon one another for assistance, or are we to wrestle with the problems alone? Can we so shape ourselves that we will help each other in all of the many problems as they arise?

I believe we can, because I believe we represent a combined industry that stands for far more than I am able to describe to you. I believe that all of our problems are mutual; yours are mine, and mine are yours. I believe it is only by getting in contact with one another that we can solve our problems.

The paper superintendent ought to get in closer contact with the superintendent of printing, in the same manner that the ink service men do. I do not mean by this to place additional burdens onto the paper mill superintendents, as I realize that they already have many; but I do believe it will result in great benefit to all concerned. I know from the experience that I have had with superintendents of paper mills that they can always help to perfect the paper, when it is made plain to them what is required and for what purpose the paper is intended.

Paper End More Important

I am thinking more of the paper end than of the ink. This is probably due to the fact that I consider it more important because when we, as printers, receive paper that is disappointing, we have very little recourse. I do not believe that we should be

(*Continued on page 98*)

*Read at the convention of the American Pulp and Paper Mill Superintendents' Association, Chicago, November 12-13, 1920.

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Editorial

Vol. LXXI New York, November 18, 1920 No. 21
FORTY-NINTH YEAR

Paper Week is Big Success

Paper week in Chicago proved to be one of the most successful and enthusiastically supported conventions which the American Paper and Pulp Association has held. Many valuable discussions on every problem conceivable to the Manufacture and sale of paper took place and several new projects were launched, the most successful of which was the founding of a Woodlands section of the American Paper and Pulp Association, an organization for which there has long been urgent need and which at last comes at a very opportune time.

The purpose of this section is to increase the efficiency of the woods operations of the pulp and paper industry in every detail, to encourage the practice of forestry on the timberland holdings and to gather and disseminate information which will promote the permanency of woods operations in the industry. The tremendous value of the thing is self evident. It does not aim to be a cure-all for the multitude of problems which now confronts the paper trade, but it will do much toward providing for the intelligent, sane handling of our timber resources without which the industry could not exist.

The membership of the new organization is not to be made up of white collar theorists, but of two fisted, practical lumber experts who know what a log drive really is and who have learned the difference between a cant-hook and a cross-cut by actual experience. This is the type of man in which the future of our forests lie and much can be expected of them. A great deal of credit is due to Assistant Secretary Porter, of the American Paper and Pulp Association, and R. S. Kellogg, secretary of the News Print Service Bureau, for their untiring efforts to make this thing a success, and it is very much to the benefit of the industry that it has now become an established fact.

Another feature of the Chicago convention was the talk on business conditions of the day which was given by David B. Forgan, president of the National City Bank of Chicago. It would be difficult to find a more sane and level headed summing up of the situation than is contained in this speech. He spoke in part as follows:

"There is no question about it, gentlemen, the reverse of the wave of business is here. You all know that just as well as I do. When you consider that if the farmers had sold their chief crops of this country four months ago, they would have gotten five billions of dollars more cash than they could get for them today, you are getting right down to the very basis of things.

"The fact is, gentlemen, when you get right down to it, that no one was to blame for the high cost of living. It was due to economic laws which is an inexorable law of gravitation, and just as that old law of demand and supply put the prices of things too high, just so surely must the prices come down. I am told that you are fortunately in about the only business left where prices have not come down very much as yet. You all know it just as well as I do that while we were climbing up the ladder, we are now climbing down. So long as we come down one step at a time, however, it will be all right; and if we keep our heads, we will neither fall off the ladder, nor will we allow any one to kick it out from below our feet; we will come down regularly and orderly and we will arrive.

"Now, what about the financial situation caused by all this? Of course you know that we have had financial expansion. There is another thing that the magazine articles blame the bankers for. I have read several articles by men who ought to know better who blame the Federal Reserve Board in Washington for the tremendous expansion of currency and credit. Why, gentlemen, you might as well talk about carrying on a war without gunpowder as without financial expansion. You cannot possibly finance a war without expansion of credit.

"We are now having the reverse of the wave. The wave that has come in, the tide that flowed in and flowed high has begun to flow back and to probably flow back a little further before it begins to come in again. But gentlemen, I am still optimistic. I see no reason why this period of adjustment should be long drawn out. I think it will be comparatively short, much shorter than any of us now can see, because I have noticed that things have a wonderful way in this country when they get down a bit of starting up again, and when they get up a bit of starting down again. I have never gone short on Uncle Sam and I never intend to.

"Now, gentlemen, I don't feel pessimistic for another reason. This thing is going to be good for the whole country at large. You perhaps won't make quite as much money and other men won't make quite as much money as they have done the last year or two. I suppose you won't believe me when I say I don't want to see my bank make as much money as it is doing, but I am perfectly sincere in that statement. I would much rather loan money at five per cent, which is a decent rate, and have comfortable business and see everything going along nicely, than to be charging my customer seven per cent and be under such a continual strain as we are at the present moment.

"So I say we are on the road to a saner business, and that is what we all should want, even if it means less profits it will be all the same to us; if the high cost of living comes down we won't need to make such big profits, and if that high cost of living does come down, as it is bound to come, it is going to be a great benefit to the whole people. Of course, it is not an easy matter. Wages have got to come down; they are coming down now to some extent, but when you come to consider that you are up against this scarcity of homes for the working man and for the clerk, it is the hardest thing in Chicago today for my clerk, if he is a married man, with a small modern salary to get a place to live in. It is the hardest thing for working men all over. Now we have got to find some way of meeting that demand by a supply of building, so that the working man and the clerk can get a cheaper home, before you can reduce his wages very much. The whole thing has got to come slowly and gradually and be handled wisely, but we are the people in America who can do it and we are going to do it; we are doing it. So I am not worried. I believe that the time will not be long when things will begin to pick up again, and money is going to be

easier, which will be encouraging, investments will go higher, and I think you will see that condition before we are very long in the new year."

Important Session of Congress

Manufacturers of all commodities and business men generally will be particularly interested in the third session of the Sixty-sixth Congress, which convenes on December 6. While it will be impossible for this short session of Congress to pass any tax legislation or to revise the tariff, these two vital questions will no doubt be fully discussed, and it is probable that hearings will be commenced on both of these subjects, so that when President-elect Harding calls an extra session after March 4, as he has already stated he will do, the new Congress will have in hand considerable data on which to work.

It devolves upon the forthcoming session of Congress to pass fourteen appropriation bills before the end of the short session at midnight on March 3, 1921. This is necessary that the executive departments of the Government may continue their work. While no doubt many other subjects will be taken up at the forthcoming session, it generally takes several months to pass these huge appropriation bills, and this will be particularly so this year, in view of the fact that the Republicans will carefully scrutinize the appropriations submitted by the executive departments.

There seems to be little question but that the excess profits tax will be repealed by Congress as soon as practicable, but just what kind of a tax will be imposed instead of this one is the problem which will not be so easily met, and one about which there is considerable difference of opinion. However, the Republican party has gone on record as favoring a general tax revision, and this, as soon as possible. The politicians as well as the business men of the country also feel that the tax must be revised, and, therefore, those who are supposed to be in close touch with the powers that be are suggesting that Congress will be in continuous session for at least two years and perhaps longer.

Helping Solve the Housing Problem

The saving of a little over $1,000, accumulated through the medium of Liberty Bonds and Government Savings Stamps, enabled a railroad man of Elmira, N. Y., to solve the acute housing problem. Along with a good many other people of the City of Elmira, he found the housing question a most difficult one to solve. His landlord, he declared, boosted his rent several times. He was just confronted with another possible increase in rent when the Chamber of Commerce launched the "Buy a Home" movement.

Just at this time it occurred to him that the $800 or more he had accumulated through investing in Liberty Bonds and Government Savings Stamps, might enable him to make the initial payment on a home of his own. He thereupon consummated a deal with a real estate operator which solved the rent problem for him. He just finished paying for his $200 worth of Victory Notes, which he had accumulated through the partial payment plan. This sum, he said, he is also going to apply on a payment for his home.

The Government Savings movement is finding this man an active supporter and missionary. At the last meeting of his Union he told his fellowmembers that if it were not for the Government securities he would not now own his own home, and called on them to follow his example by beginning to save and invest in Government securities.

He told John L. Hartnett, the labor representative of the Government Loan Organization, that any effort to form Savings Associations among the railroad men, either in the organization to which he belongs or in the shop where he is employed, will meet with his support, and that the Government can always count on him to support any movement in that direction.

A Research Information Bureau

The National Research Council has established a Research Information Service as a general clearing-house and informational bureau for scientific and industrial research. This "Service" on request supplies information concerning research problems, progress, laboratories, equipment, methods, publications, personnel, funds, etc.

Ordinarily inquiries are answered without charge. When this is impossible because of unusual difficulty in securing information, the inquirer is notified and supplied with an estimate of cost.

Much of the information assembled by this bureau is published promptly in the "Bulletin" or the "Reprint and Circular Series" of the National Research Council, but the purpose is to maintain complete up-to-date files in the general office of the Council.

Requests for information should be addressed, Research Information Service, National Research Council, 1701 Massachusetts Avenue, Washington, D. C.

National Paper Products Co. Changes

CARTHAGE, N. Y, November 15, 1920.—The National Paper Products Company has sent out the following announcement: "The National Paper Products Company regrets to announce the resignation of H. L. Samson, for the past six years general manager of its Eastern division. Mr. Samson is at the disposal of the company in an advisory capacity.

"E. B. Eddy, for many years general superintendent, has been appointed manager of the Carthage division. H. C. Ballard, manager of the converting department, has been appointed assistant manager. J. J. C. Downey, sales manager, will move his headquarters from New York City to Carthage. M. L. Dinkelspiel has been transferred from headquarters in San Francisco to the Eastern division as general headquarters representative.

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SERVICE EXPECTED BY BUYERS OF PRINTING

(*Continued from page 94*)

compelled to go on, getting away with material that is not suited for the purpose for which it is to be used. As I see it, there can be only one result, and that is a disappointed customer. This not only affects the printer, but it reflects back on the entire combined industry.

What we would like to do is to arrive at a suitable standard of material, both ink and paper—a standard that will be used for the various kinds of printed matter; the kind of paper that will be just right for process printing, or any other process for which it is intended.

We want to turn out a class of printed matter that the ultimate consumer will understand, and in which he will have confidence. We want to do away with overreaching ourselves in the use of paper and inks that we know down in our own hearts are not suitable, and where we know there is danger. This has been the cause of many disappointments, and will continue to be so unless we adopt standards that are satisfactory.

Do Away with Gambling

My idea is to do away with the gambling with the future of the industry. What good can we do the industry as a whole, even if we do get away with this lot of stock and printed matter, if in the course of time we find that through our neglect and indifference to final results, we have let the quality of printed matter run down, regardless of cause—it may be paper, ink, or printing? Will the value not also come down with it? It is the value that we want to maintain.

What we want to aim to do is to build up the combined industry —printing, inks and paper. I have always felt that this is my duty. It is the duty of every thinking practical superintendent, and I can assure you that while I am in it I want to continue to contribute every little mite that I can toward a quality that will stand.

There is no doubt in my mind but that I voice the sentiments of all of you. You are all as interested as I am; otherwise you would not be here. The only question that arises is how we can successfully work together. I realize that the paper mills as a rule are not as close to the printing centers as the ink manufacturers are, and it is not always possible for the paper mill superintendents to give the kind of service to the printer that I have in mind; but I want to emphasize that if it is important that we as printers get in contact with our customers and learn to know their needs, I can see no better solution than to have the paper superintendents do likewise.

After Final Result

It is the final result that we are after. I believe I have told you what I think is the kind of service the customer of a printer requires and expects. I have tried to have you all understand that if our customer makes good on the printed matter that we sell him we have all made good. The combined industry has made good.

As the final outlet of all the material that enters into printed matter passes through to the customer of the printer, my aim has always been to have you realize the importance of having the confidence of the ultimate consumer. I mean by this that the person who selects his merchandise from illustrated printed matter does so because the illustration has so pictured the article to him that he can form an opinion of what it, in itself, really looks like. When he does this, he really becomes the final judge of printed matter, and he is the one who makes it possible for the many of us to be engaged in this most interesting of all industries.

The Proper Solution

It has also been my object to make it plain that by coming in contact with the work in question by the paper mill superintendents, as well as the ink men, is the proper solution. I do not believe that you would get exactly the right kind of results by assisting generally, but I do believe that if the paper mill superintendent would visit the printing establishments that consume the product from his mill, if he could be advised and see for himself how it works out, and make note of its shortcomings, I believe that he could go back and eliminate many of these objectionable features that we as printers come in contact with on the paper.

There are, as you all know, many kinds of printed matter—in fact, many classes; but when we speak of service, I think we had better confine ourselves to the classes that are important from a financial realization on the part of the customer of the printer. If there are any other classes, we need not include them, because if we can do justice to the kind of printing I have in mind, my opinion is it will keep us all on the job.

Some Classes of Printing

It may be advisable to mention some of the classes. There is at present, and has been for some time, considerable printing turned out that is used in order to sell merchandise by mail. I believe we are all more or less familiar with this class. I am wondering, however, if the many that are engaged in this class of printing, or contribute material that goes into it, realize the importance of maintaining this class of printed matter so that the full returns from it will be realized.

Did it ever occur to you that the artist and the engraver, by careless handling of their part of the work, could discourage the use of it by the mail order concerns?

The printer and paper maker, as well as the ink maker, would suffer in spite of the finest kind of workmanship on their part. If this is true—and I am here to tell you it is possible—then it is also possible to discourage the use of mail order printing, if the printer, paper and ink makers do their work carelessly or produce inferior work.

This will hold true on all kinds of classes of printed matter as well. Without my enumerating the classes, think for yourself, and if you know of any class where this does not hold true, then it is not in the class that needs any attention in connection with what we term as service. I believe this holds true in lithographing as well as printing.

Some Matters to Bear in Mind

I will only ask you to keep in mind that it is not my object when I talk of quality and value, to endeavor to see how much money can be put into printing. It is just the opposite. My aim is to have paper and ink just right for the purpose for which it is intended; so that half-tones can be printed when it is intended to use half-tones; and to have paper suitable for color process work when it is intended to use the color process; and so on.

Also keep in mind that if the consumer or the party who buys his merchandise tires of improper printing, and should insist upon seeing his merchandise before buying, would we not all be the losers?

Remember these things! Give service to your customers that will build up the entire industry; do not gamble with the industry; and strive to please the public that buys.

Paper comes in to us when we are all ready to go to press. We have our engravings, electrotypes and everything ready to go ahead with the printing. The job is scheduled to go out at

the present time. There is the paper. We find on examining the paper, the paper is not what we expected. Regardless of what you may adopt, as I see it, in the way of manufacturing paper, the thing that gives the printer the most difficulty is the fact that the paper does not run uniform, sheet after sheet. We will find in every fourth or fifth sheet, for instance, that the paper stock picks, as we term it; the coating of the paper lips as it goes through the press. We will find a few sheets that are all right.

We ink up, set our fountain on the press. We judge the consistency of that ink to give the best results on the sheets that are good, only to find out when the bad sheet runs through the press, it is not only spoiled, that sheet itself, but it spoils also subsequent sheets. We must think of a way to overcome it.

On a poorly coated sheet, when it happens to be mixed with good ones, the customary method is to reduce the consistency of the ink, and as our pressman explained to you, we reduce it to a point where it has no concentration of color.

Poor Printing from Poor Paper

What is the result? The result is that, because every fifth sheet is poor, we have to sacrifice the quality on the entire job through the entire run. This same condition—and it is one of the meanest ones to overcome—the fact that good paper and bad paper are mixed together—if we find that the surface is not right, well, it is up to us to use our head to the extent that we select an ink that will appear pretty good on the surface. I will mention something about the surface of the papers later, but those are the conditions, as we have seen them, when the paper is disappointing. There are many other things that enter into the conditions of paper as we receive it, and I will probably be able to think of a few more as I go along. But the most severe condition is the fact that we get mixed paper.

For instance, on color work, we find one sheet, as the fountain is set, will take the correct amount of color, and a few minutes afterward we find a sheet that will not take the ink at all, and we run a few more and find one that takes an abundance of ink. We can't set our fountain on this different matter.

Standard for Process Printing

Now, referring to the process of printing, there is a process known as a three or four color process. As far as the photo-engravers are concerned, they know and understand this process. Is it going to be a great problem to arrive at a suitable standard of process paper? I can't see a great problem in it. I know there are problems in paper making, but it seems to me if you get paper that is suitable for that, why can't we stick to it and adopt that as a standard of process printing?

As a matter of criticism, I had in mind, first of all, the mixed papers. There are so many different kinds of mixed papers I really can't recall all of them now, but it is the lack of uniformity that causes the printer most trouble.

We also have considerable trouble with folding paper, particularly folding the enameled paper. We find that they don't stand up in winter as well as they do in summer time. They seem to dry out. While we have selected a good folding paper one season of the year, printed later on, and a cold snap comes on, it seems to dry up and crack, and we are unable to fold it. I mention this because it is one of the needs of the printing industry today.

Too Many Names for Papers

I don't know how many names there are for papers. It would be impossible for any printing superintendent or any individual to keep track of the names of papers, what they stand for and what they are like.

It would seem to me there are only a few formulæ necessary, in the way of turning out coated paper. If you could arrange to number them in a way so that we would understand the numbers of them, one, two, three or four, whatever it is, it would be much easier.

A man asked me, "What do you think of so-and-so paper?" It may be a name that I never heard of. Another man asked me, "What do you think of such and such a paper?" "Well, from what I have seen of that paper it is no good for this purpose, it is no good for that purpose."

This is one great conglomeration. We will never get anything out of it unless the paper mill men get together and standardize some of the papers most universally used, so that the printing house superintendent can get familiar with them and have numbers of them so that he can specify them by number. If a man wants to buy a carload of paper, he will say, "I am going to print a four-color process on it. What kind of paper do you recommended?" If I recommend one paper house because of the name, he might think there is some partiality, whereas if he would say, "Get number 1" or "Get number 2," we would know it was all right, regardless of where we got it, and we could look forward to getting this class of paper for use, because we are thoroughly acquainted with it.

New Cellulose Periodicals

The Committee on Bibliography of the Technical Association of the Pulp and Paper Industry desires to call the attention of the paper industry, and especially those interested in scientific and technical cellulose chemistry, to two new German periodicals which are devoted entirely to cellulose.

Zellulose-Chemie. Wissenschaft Beiblätter zu der Zeitschrift "Der Papierfabrikant."

This periodical, which is issued as a supplement to *Der Papierfabrikant,* is edited by Emil Heuser of Darmstadt. Volume 1, number 1, appeared April 30, 1920. It appears at monthly intervals, each number containing from 8 to 12 pages. The scope of the magazine may be seen from the following contents of the first five numbers.

No. 1—April 30, 1920—Advances in Celulose Chemistry, by Emil Heuser.

No. 2—May 28, 1920—Methylation of Cellulose, by Denham and Woodhouse. (Translation of articles appearing in the *Journal of the Chemical Society* 103, 1735 (1913); 105, 2357 (1914).

No. 3—June 18, 1920—Trimethyl Glucose from Cellulose, by Denham and Woodhouse (translation from the *Journal of the Chemical Society,* 111, 244 (1917). The estimation of cellulose in wood, by W. H. Dore (translated from paper 26, No. 1, 10 (1920).

No. 4—July 16, 1920—The Enrichment of "Kraftstroh," with fungus protein, by Pringsheim and Lichenstein.

No. 5—August 20, 1920—Preparation of Alcohol from Wood, by Emil Heuser. The constitution of cellulose; an abstract of the work of Hess, appearing in the *Z. Elektochem,* 1920, p 233.

In addition to the major articles, each number contains a number of abstracts of articles from other journals on the subject of cellulose.

Der Papierfabrikant is published by Otto Elsner, Berlin, S. 42, Germany.

Zellstoffchemische Abhandlungen.

This monthly magazine is edited by Carl G. Schwalbe, of Eberswalde, and is published by Carl Hofmann, Berlin, S.W. 11, Germany. The price of the first five numbers of 1920 is 20 marks.

The first number (June, 1920) contains an article by Rudolf Sieber on the determination of the calcium content of fresh sulfite liquors according to Feld-Sander; and also the first part of an article from the laboratory of Ost in Hannover on the acetolytic decomposition products of cellulose, by R. Prosiegel. The July number completes the article by Prosiegel and contains in addition an article by Schwalbe and Ernst Becker on the chemical composition of mechanical wood pulp.

CLARENCE J. WEST, Chairman.

THOSE AT SUPERINTENDENTS' CONVENTION

Fred C. Boyce, Wausau Paper Mills Company, Brokaw, Wis.

James S. Clemons, Hummel & Downing Company, Milwaukee, Wis.

Wm. T. Fogarty, Northern Paper Mills, Green Bay, Wis.

Wm. A. Kelly, Northern Paper Mills, Green Bay, Wis.

John Hercher, John Strange Paper Co., Menasha, Wis.

A. T. McFarlane, Green Bay Fibre and Paper Company, Green Bay, Wis.

W. K. McNair, The Northwest Paper Company, Cloquet, Minn.

J. T. Mader, Menasha Printing and Carton Company, Wausau, Wis.

Peter J. Massey, 3340 N. Paulina Street, Chicago, Ill.

G. W. Mericle, Geo. A. Whiting Paper Company, Menasha, Wis.

Frank Monaghan, Wausau Sulphate Fibre Company, Mosinee, Wis.

Earl W. Sharpless, Menasha Printing and Carton Company, Menasha, Wis.

Edward Shields, Green Bay Fibre and Paper Company, Green Bay, Wis.

Paul J. Sievert, Marinette and Menominee Paper Company, Marinette, Wis.

J. H. O'Connell, F. Johnson and J. Kuss, King Paper Company, Kalamazoo, Mich.

M. Redmond, Kalamazoo Paper Company Paper Company, Kalamazoo, Mich.

Peter Denner, Kalamazoo Paper Company, Kalamazoo, Mich.

E. T. A. Coughlin and G. H. Pountain, Monarch Paper Company, Kalamazoo, Mich.

A. G. Wightman, Hawthorne Paper Company, Kalamazoo, Mich.

C. Harter, Rex Paper Company, Kalamazoo, Mich.

Jacob Parent, Western Board and Paper Company, Kalamazoo, Mich.

S. Simpson, Bardeen Paper Company, Otsego, Mich.

C. W. Ulrich, Wolverine Coated Paper Company, Otsego, Mich.

John E. Daley, Port Huron Sulphite and Paper Company, Port Huron, Mich.

John P. Cooney, Peninsular Paper Company, Ypsilanti, Mich.

Louis J. Meunier, Boheme and Rauch Company, Monroe, Mich.

Cyrus E. Frye and John A. Spaulding, Lincoln Paper Mills, Elkhart, Ind.

Kenneth T. King, 1114 Tribune Building, Chicago, Ill.

Lee L. Wilson, Morris Paper Mills, Morris, Ill.

Al. Rolfe, Champion Coated Paper Company, Hamilton, Ohio.

H. W. Server, Miami Paper Company, West Carrollton, Ohio.

John F. Yordy, Howard Paper Company, Urbana, Ohio.

Floyd A. Tifft, Chillicothe Paper Company, Chillicothe, Ohio.

Benjamin Bishop, Gardner-Harvey Paper Company, Middletown, Ohio.

Benjamin Bishop and Jack Smith, Gardner-Harvey Paper Company, Middletown, Ohio.

Jos. W. Harbrecht, Hinde and Dauche Paper Company, Sandusky. Ohio.

Michael Ludwig, Jr., Mead Paper Company, Chillicothe, Ohio.

W. T. Schenk, Champion Coated Paper Company, Hamilton, Ohio.

Lloyd T. Murphy, Auglaize Box Board Company, St. Marys, Ohio.

Norman E. Brokaw, M. & O. Paper Company, International Falls, Minn.

E. J. Raney, Chicago Mill and Lumber Company, Chicago, Ill.

Otto Kress, Forest Products Laboratory, Madison, Wis.

Earl E. Johnson, International Paper Company, Niagara Falls.

W. D. Gregor, Arrowhead Mills, Fulton, N. Y.

Peter Nesbit, Tonawanda Paper and Board Company, Tonawanda, N. Y.

M. J. Argy, Cliff Paper Company, Niagara Falls, N. Y.

W. J. Argy, St. Regis Paper Company, Niagara Falls, N. Y.

Wm. Brydges, Defiance Paper Company, Niagara Falls, N. Y.

Nelson R. Davis, S. D. Warren Company, Cumberland Mills, Me.

Daniel Daverin, Provincial Paper Mills, Thorold, Ontario.

Joseph J. Hubert, Abitibi Power and Paper Company, Iroquois Falls, Ontario.

William Whyte, Montreal, Canada.

T. H. Neville, Beaver Board Company, Thorold, Ontario.

D. C. Amerine, Vincennes, Ind.

A. G. Adams, Chicago.

D. C. Andrews, Cloquet, Minn.

D. C. Andrews, Grand Rapids, Minn.

W. A. Altman, Chicago.

H. K. Anderson, Dayton, Ohio.

W. H. Braunon, Alexandria, Ind.

A. A. Bush, Pittsfield, Mass.

J. Biersdorfer, Chicago.

H. J. Bartlett, Chicago.

F. H. Becker, Walpole, Mass.

Ward E. Black, Green Bay, Wis.

A. E. Bridge, Middletown, Ohio.

J. A. Bowers, Erie, Pa.

H. E. Bolsey, Chicago.

C. T. Buss, Roches, Ontario.

L. H. Breyfogel, Kalamazoo, Mich.

Geo. Banner, Oconto Falls, Wis.

J. L. Brown, Chicago.

Bernard Benson, Chicago.

G. C. Burton, Chicago.

W. H. Burns, Appleton, Wis.

F. C. Cook, Chicago.

J. D. Cunningham, Chicago.

H. F. Cromwell, Chicago.

E. H. Cornell, Chicago.

J. M. Cathcart, Middletown, Ohio.

C. A. Croxen, Chicago.

S. Dauman, New York.

A. J. Dowd, Chicago.

Theo. W. Dunn, Detroit, Mich.

W. C. Daly, Chicago.

F. E. Dial, Chicago.

L. K. Deturtey, Norristown, Pa.

John Edson, East Walpole, Mass.

R. H. Englehart, Chicago.

P. R. Ellsworth, Chicago.

T. L. Edwards, Brokaw, Wis.

H. C. Evans, Alton, Ill.

F. B. Eilers, Kalamazoo, Mich.

F. C. Farnsworth, Conshohocken, Pa.

H. G. Fergas, Chicago.

Dr. Eugene Friedman, Chicago.

W. B. Fulton, Middletown, Ohio.

Jas. Foxgrover, Kalamazoo, Mich.

Frank Dunaway, New York.

Paul de Guchery, Passaic, N. J.

Robert M. Guie, Philadelphia, Pa.

W. H. Guidotte, Chicago.

Walter S. Gregg, Kansas City, Mo.

W. R. Harris, Monroe, Mich.

Charles F. O'Hagan, Pittsburgh, Pa.

K. M. Haugen, Wausau, Wis.

Frank H. Hoberg, Green Bay, Wis.

L. E. Housley, Jersey City, N. J.

Tom Harvey, Middletown, Ohio.

C. R. Jones, Chicago.

M. D. Johnson, Chicago.

M. Kavanaugh, Chicago.

R. H. Kelley, Marathon, Wis.

Kenneth F. King, Chicago.

E. E. Keyes, Kalamazoo, Mich.

H. R. Lewis, East Walpole, Mass.

F. H. Lueders, Dayton, Ohio.

Stuart D. Lansing, Watertown, N. Y.

O. L. LeRaux, Port Edwards, Wis.

Herbert Lippitt, Portland, Me.

R. H. Lathman, Bogalusa, La.

Frank A. Leavens, Neenah, Wis.

J. H. Lynch, Chicago.

M. M. McGregor, Chicago.

B. Emerson, Chicago.

Jas. T. Murphy, Chicago.

E. W. Morgan, Chicago.

Allan B. Milham, Kalamazoo, Mich.

W. F. McGraw, Detroit, Mich.

Leonard Mann, New York.

C. W. McAlpin, So. Bend, Ind.

A. L. Meyer, Minneapolis, Minn.

E. R. MacLaren, Albany, N. Y.

A. M. Meincke, Menasha, Wis.

John A. Martin, Ashland, Wis.

C. E. Maeser, Green Bay, Wis.

H. B. McDonald, Fitchburg, Mass.
G. W. Mericle, Menasha, Wis.
Arthur M. Phillips, Beloit, Wis.
Elbert G. Milham, Kalamazoo, Mich.
A. W. Nason, Chicago.
I. L. Nicol, Toronto, Canada.
Chas. H. Noble, Kalamazoo, Mich.
Ray North, Green Bay, Wis.
W. D. O'Neill, Chicago.
Walter E. Packard, Erie, Pa.
G. H. Panushka, Chicago.
C. A. Poland, Putney, Vt.
P. R. Phillips, Rhinelander, Wis.
A. F. Richter, Watertown, N. Y.
H. F. Rehberg, Chicago.
E. J. Rootes, Chicago.
W. B. Rapley, Kalamazoo, Mich.
Jos. H. Slater, Herkimer, N. Y.
L. E. Smith, Port Edward.
Ralph M. Snell, Holyoke, Mass.
Arthur J. Sigel, New York.
Victor Sund, Chicago.
A. G. Stone, Marinette, Wis.
P. A. Smith, Combined Locks, Wis.
J. S. Stewart, Chicago.
C. C. Stewart, Franklin, Ohio.
Homer E. Stafford, Watertown, N. Y.
A. H. Tanyane, PAPER TRADE JOURNAL, New York.
H. L. Treadwell, Chicago.
W. H. Theroux, Sandusky, Ohio.
Clinton K. Textor, Madison, Wis.
John A. Turner, Chicago, Ill.
Frank A. Tucherer, Newark, N. J.
M. L. Ulrich, Ft. Madison, Iowa.
W. Van Orber, Chicago.
J. W. Van Alstyne, Appleton, Wis.
L. R. Verdon, Kalamazoo, Mich.
H. K. Vinton, PAPER TRADE JOURNAL.
H. D. Welles, Glen Falls, N. Y.
John D. Watson, Appleton, Wis.
T. B. Wilson, Chicago.
W. H. Beckurth, Morris, Ill.
C. A. Chapman, Chicago.
A. R. White, Menominee, Mich.
A. F. Wilcox, Chicago.
W. A. Gale, Albany, N. Y.
O. V. Gates, Lee, Mass.
Sidney D. Welles, Madison, Wis.
Gilbert S. Main, Chicago.
E. B. Fritz, Chicago.
P. B. Darrell, Chicago.
J. L. Matthai, Chicago.
L. D. Post, New York.
J. Cornell, New York.
Geo. R. Busher, Chicago.
Wm. M. Anders, New York.
S. E. Abramson, Chicago.
A. G. Van Eman, Chicago.
T. P. Harmon, Chicago.
H. W. Reynolds, Chicago.
Fred Krauhold, Appleton, Wis.
Ernest Mahler, Neenah, Wis.
H. E. Harmon, Watertown, N. Y.
F. A. Whittaker, New York.
Albert Emerson, Chicago.
S. V. Burrows, New York.
G. A. Dowd, Beloit, Wis.
G. A. Macklem, Beloit, Wis.

CANADIAN PULP AND PAPER EXPORTS

Canadian pulp and paper exports for the first six months of the fiscal year, ending September 30, were valued at $87,243,476, as compared with $43,745,972 for the corresponding period in 1919, a gain of $43,497,504, or approximately 100 per cent. They exceeded by $3,380,910 the total value of all such exports for the entire fiscal year ending March 31 last and were practically fourteen and one-half times the value of all similar exports during the same period of 1918. They were made up as follows:

Paper and mfgs. of	$43,025,764
Sulphate (kraft)	6,887,557
Sulphite, bleached	7,889,214
Sulphite, unbleached	18,802,783
Mechanically ground	10,638,158
	$87,243,476

The paper exports included 33,636 cwts. of book paper, valued at $356,788; 7,537,441 cwts. of news print, valued at $35,760,333, and miscellaneous paper to the value of $6,908,643. A comparative statement for the six months' period shows:

	1918	1919	1920
Paper	$21,821,915	$27,119,246	$43,025,764
Chem. pulp	15,903,189	14,008,388	33,579,554
Mech. pulp	2,512,086	2,618,338	10,638,158
Totals	$40,237,191	$43,745,972	$87,243,476

The destinations of the 1920 six months' exports were:

	United Kingdom	United States	Other countries
Paper	$2,403,079	$33,899,788	$6,722,897
Wood pulp	5,610,648	35,834,034	2,773,030
	$8,013,727	$69,733,822	$9,495,927

Exports of pulp and paper for the month of September were valued at $16,490,702, compared with $8,330,557 in September, 1919, an increase of $8,160,145.

Paper exports included 3,291 cwts. of book paper, valued at $32,609; 1,212,225 cwts. of news print, valued at $6,542,179, and miscellaneous paper valued at $1,280,705.

Exports of wood pulp of all grades for the month again show large increases over last year. Exports of sulphate (kraft) amounted to 274,190 cwts., valued at $1,398,092, as compared with 243,991 cwts., valued at $836,089 last year; sulphite, bleached, 222,306 cwts., valued at $1,999,016, compared with 87,339 cwts., valued at $453,096; sulphite, unbleached, 513,526 cwts., valued at $3,361,048, compared with 524,769 cwts., valued at $1,942,391; mechanically ground, 424,689 cwts., valued at $1,877,053, compared with 415,046 cwts., valued at $511,402.

Summarized the month's exports were:

September	1919	1920	Gain
Paper	$4,587,579	$7,855,493	$3,267,914
Chem. pulp	3,231,576	6,758,156	3,526,580
Mech. pulp	511,402	1,877,053	1,365,651
Totals	$8,330,557	$16,490,702	$8,160,145

The countries of destination were:

Paper and manufactures of:	1919	1020
United Kingdom	$361,087	$390,313
United States	3,913,721	6,228,615
Other countries	312,771	1,236,565
Wood pulp:		
United Kingdom	193,771	1,023,924
United States	3,153,088	7,228,818
Other countries	396,119	382,467

Exports of unmanufactured pulpwood for September amounted to 151,541 cords, valued at $2,046,868, compared with 89,470 cords, valued at $884,575, in September, 1919, and for the six months' period, 653,856 cords, valued at $7,803,332, compared with 515,444 cords, valued at $5,089,693, the year previous. All of the pulpwood exported went to the United States.

Silverton Ore to Have Pulp Plant

SALEM, Ore., November 10, 1920.—Erection of a pulp mill to be operated in connection with the lumber plants of the Silver Falls Timber company at Silverton was announced recently by the management of the latter concern. By-products of the sawmills of the Silverton company will be ground at the pulp plant and shipped to the various paper mills of the Pacific northwest to be converted into the finished product.

Work on the pulp plant will start in the near future, according to present plans, and upon completion the mill will represent an expenditure of several thousand dollars.

NATIONAL PAPER TRADE ASSOCIATION MEETS

Fall Conference in Connection With the Meeting of the American Paper and Pulp Association at Chicago Is Largely Attended by Representative Paper Merchants From All Over the Country—Optimistic Views Were Generally Expressed for a More Favorable Development of Business After the First of the Year—Standard Cost System Is Discussed

CHICAGO, November 10, 1920—The Fall meeting of the National Paper Trade Association opened at the Blackstone Hotel on Wednesday at 10 A. M. Separate sessions of the Fine Papers Division and the Coarse Papers Section were called at the same hour. The general business situation was freely discussed in the hotel corridors, and though an evenly divided opinion on the present conditions in the trade was found to exist, there was an omtimistic view held out for the business to develop after the first of the year. A general session was held later, during which the chief topic of discussion was the establishing of a "Standard Cost System." On Thursday the paper merchants joined with the paper manufacturers for luncheon.

Meeting of Fine Paper Division

The meeting of the Fine Paper Division of the National Paper Trade Association was called to order by C. N. Bicknell at 10:30 A. M.

THE CHAIRMAN: Gentlemen, come to order. The large attendance here this morning is very gratifying, and indicates that your Board made no mistake in calling this meeting. We are convened at a time when a review of the situation and an exchange of opinions is most opportune. A number of carefully prepared papers will be presented, which will give to us the patent facts, and the general discussion to follow should bring out opinions which will enable the members of this Association to arrive at some fairly definite conclusion as to the actual conditions.

The first paper, "Relations with Manufacturers," will be read by the first president of the Association, O. A. Miller.

O. A. MILLER: Mr. Chairman and gentlemen, I am sorry to have it referred to as a paper, for my remarks will not be long and are not worthy of such a title.

It is gratifying to see the interest manifested by the attendance here today, and a personal pleasure to me to look on your faces again. What I may have to say is from my own heart. I hope it may receive a response.

For four years we have faced trying problems, and it is pleasing to recall the co-operation that has maintained between the manufacturers and merchants, to the end that we came through without disaster. We have had ups and downs, and are now facing a difficult situation which calls for the fullest and most considerate co-operation, and I am quite sure we shall not fail, but it shall require patience and hard-headed wisdom, and mutual confidence, to bring order out of confusion, and place the industry upon stable foundation which must be on a solid basis of values.

We need full production and even distribution, which can only be maintained on a level of prices, based on cost and reasonable margin of profit to manufacturers and merchants, after the inflation on materials, labor, and overhead are wiped out. There has been less of inflation in the paper industry than others, but we are so closely related to the others that we cannot help but be influenced by the general situation, and all must unite to put commerce on the sure footing of sound values. When we do this, an era of great prosperity will surely ensue, for no country on earth ever had the wealth of resources we now hold in this country.

There has been a division on political policies, but since the unprecedented election of November 2d, there is only one clear-cut policy of reconstruction for our own business and our relations to the World of Nations, in which we hold a conspicuous place, and I contemplate the future with fullest confidence.

THE CHAIRMAN: The next subject, gentlemen, is "Production and Consumption for the Year 1921." This is to be given by a man who is always very careful in preparing anything in the nature of a paper. He is always well worth hearing. We will hear from Mr. Olmstead. (Applause.)

GEORGE OLMSTEAD: Members of the Fine Paper Division of the National Paper Trade Association and Fellow Republicans:

Some one made the remark that the subject allotted to me was bigger than all outdoors, and so it certainly appears to be.

As business men, we appreciate the inexorable nature of this law of supply and demand. Demand has been in control for so long that we may forget that some day, like the Democratic Party, it will have to step down and out, and supply will take control of affairs; therefore, it is quite desirable that we get as good a perspective as we can on the present situation in the paper industry as affected by this law.

The North-American continent was the only one with a substantial product of paper that during the war was able to continue practically uninterrupted manufacture, and at the same time maintain its paper producing plants at anything approaching a normal condition. The keystone, in fact, the very foundation of our whole paper industry today, is wood—wood fibre adaptable to paper-making. This very fact constitutes a fundamental reason why the paper industry occupies a most unique position among the world's commodities. If more cotton and wheat are needed, it is only necessary to plant a larger acreage. The supply of leather and wool can be increased by the raising of more cattle and sheep, but a good spruce tree requires from 50 to 100 years before it can be useful to the papermaker. We, in the United States, have been so profligate in the use and waste of our timber resources that we are fast reaching a point where, like England, we will be dependent upon outside sources for our raw materials. Are you aware of the fact that three-fifths of our original timber in this country is gone and approximately two-thirds of what is left is west of the Mississippi River and not easily available?

We are using timber four times as fast as we are growing it, and only now as a nation are we beginning to realize our situation and the necessity of taking remedial measures, and those promptly. It is altogether possible that in the next few years we may find ourselves temporarily with an excess of pulp wood, but this does not in any way alter the fact that we are moving steadily onwards towards a pulp wood famine.

The final answer to the problem is a different order of conservation or the discovery of a substitute fibre. Competent authority tells us that the next year's pulp wood cut will be a large one because the prices paid are very attractive and the lumber market is weak, so this particular year the operatives with pulp timber prefer to cut pulp wood. It is said that some of the farmers in Canada are neglecting their farms and cutting their timber because of the almost fabulous price they are receiving for it.

In considering any overproduction, we must keep in mind three factors, i. e., pulp wood, wood pulp and paper. It is altogether possible that for the reasons given, the next few years may see an oversupply of pulp wood and more than the necessary paper machine capacity, but some of us cannot see how there can be any overproduction of pulp because of the limited capacity for making pulp, particularly ground wood, which depends so very largely on water power. There are a good many mills now under con-

struction or in prospect that may find considerable difficulty in getting their supplies of raw material.

It is estimated that the years 1920 and 1921 will see the installation in the United States of 100 new paper-making machines, producing about 4,800 tons every 24 hours or nearly 1,500,000 tons per year. This will give us an increased machine capacity of 25% for book paper—33% for boards and about 7% for writing.

With the growth of this country and its business and the extension of our trade into other parts of the world, this increase in production is not disturbing—in fact, the normal increase in consumption, to say nothing of the extraordinary increases in particular directions, would seem to justify this or even larger production.

We have heard much in the last few months of the offerings of foreign paper at low prices. This whole thing seems to be insidious propaganda, designed to confuse the paper situation in this country and to retard the progress that American made papers have been making in the markets of the world. These foreign offerings had the earmarks of legitimate business, but when they were accepted it was found that the condition of the offer "without engagement," as the foreigner puts it, provided the necessary release from the responsibility of executing the order. The fact is that few such orders were actually filled and the foreign demand for our paper products which naturally fell off in the face of this propaganda is becoming more active.

A whole book could be written on this subject of production, but I am only aiming to get before you a fair picture of the situation from a producing standpoint, for if it develops that "Supply" is to come into control, then the subject of "Demand" will become our chief study and source of anxiety.

In the last five years paper has taken a new and bigger place among the world's commodities—the war taught us something of the power of the printed and the written word. To paraphrase a quotation from Tennyson,

"More things are wrought by paper
than this world dreams of."

This appreciation of the value of paper in the world's work will continue to grow higher and higher even though from time to time there may be setbacks.

I saw not long since a very interesting chart showing the approximate total volume of money spent annually on various forms of advertising. It was claimed that this was the most accurate and authoritive statement of the volume of the business in each general broad division of advertising. The total annual expenditure was $1,284,000,000 and the three biggest divisions of this total, involving the expenditure of over $1,000,000,000, are directly tied in the paper business. The three divisions with the expenditure in each are as follows:

Newspapers	$600,000,000
Direct-by-Mail	300,000,000
Magazines	150,000,000

The division that means most to us, as merchants, and to our customer, the printer, is the one of "Direct-by-Mail advertising." We have only touched the surface of the possibilities of development along this line. Every one these days has a message to carry to some one. Out of this war will vertainly come a closer affiliation and association between the peoples of the world. We are bound, at least, to know how the world is moving, and to get this information requires paper. Theoretically it would appear that there must be a very large consumption of paper for 1921, but there is one factor we must always reckon with and that is the attitude of the human mind. The people of the U. S. know that we have been at war; they know that commodity values are greatly inflated; they feel we have reached the peak and that a recession in prices must come eventually. It is not surprising, therefore, that consumers, both individual and business, should hesitate to buy on this market beyond their most urgent needs. Purchases are being restricted and this shortage of orders has produced the present, and I believe, temporary inactive condition of trade.

While, of course, a very general business depression would affect the paper business, still it is a fact that paper constitutes one of the business building materials. Some business men employ more advertising and publicity, and consequently use more paper in an inactive than active market so that our commodity can easily constitute an exception to the rule.

As a sidelight on the probable consumption of paper for advertising in 1921, it is interesting to learn that the big advertising agencies met in New York Cty a few weeks ago. In numbers, these agents represent less than 10% of the total number of advertising agents, but they control 90% of the national advertising placed in this country. It was, therefore, comparatively easy for these particular advertising men to give us a line on the trend of advertising for the coming year. A summary of the reports of this meeting revealed that the advertisers of the United States have appropriated 10% more money for their advertising budgets in 1921 than they did for 1920. When we realize that 1920 was a banner year and exceeded all records for advertising appropriations, we will appreciate what this increase for 1921 really means. Of course, we must remember that this 10% increase which is in money may be taken up by an increase in advertising costs, but even if the volume of advertising only equals that of 1920, I think we shall have no cause for complaint. Also, we must not forget that many of the advertising budgets for 1920 were never executed as in many cases there was a shortage of paper or other material.

Now, to sum up, I agree with what Pierepont Morgan said,

"It does not pay to be a 'Bear' on
the United States of America."

If any industry involving a big important commodity like paper can afford to be optimistic, the paper industry can—optimistic from all standpoints, but particularly with respect to the demand for our product. Our country's richest asset is its resources—developed and undeveloped. Every doubt as to what the future of America has in store for us disappears when our fundamental resources are recalled. Do not forget that the United States, with only 6 per cent of the world's population and 7 per cent of the world's land, produces

20 per cent of the world's supply of gold.
25 per cent of the world's supply of wheat.
56 per cent of the world's supply of paper.

These are facts and we know them. We have the most wonderful proposition in the world, but we must sell it. First, we must sell it to ourselves, and then the rest of the world will follow. It will be very much more wholesome and make for sounder growth and more substantial development if we can have more uphill work than we have had the last four or five years. Salesmanship will become a lost art unless it gets more exercise than it has been recently having. Let us merchants do our part in creating new business—opening up fresh avenues for the use of paper. It's the creative instinct we want to develop now. We have been riding along at a pleasant speed, possibly not conscious that we were being hauled. It may be as well to cut the rope now and install an engine in our vehicle and then proceed under our own power. A period for stock taking will not be amiss, not only to inventory our merchandise, our policies and our capabilities, but our efficiency and our mental attitudes. We can then take a fresh start and prepare ourselves for the new day which will present new problems and larger responsibilities.

After all is said and done, the best guarantee of America's future prosperity is the energy, initiative and commercial genius of the business men of this country.

THE CHAIRMAN: We have with us today several men from Canada, men we are always glad to see here. We want them to

take part in our deliberations, and we want to hear from them. I would like to hear first from Mr. John Martin of Winnipeg.

MR. JOHN MARTIN: Mr. Chairman and gentlemen, this is a surprise to us Canadians to come over here and be asked to express what we think and know about our own conditions at home. I would just like to say, Mr. Chairman, on behalf of the Canadian Paper Trade Association, that we thank you heartily for the nice invitation Mr. Ridgeway sent us to be here. We came here with the idea of keeping our ears very close to the ground. We are particularly anxious to understand conditions, so that they may reach us, so that we may have them at first hand, because as a small country compared with you we have everything radiate from you to us, and the conditions pass along and the feeling generally is about the same.

I am sorry that Mr. Graham, the president of our Association, is not with us today. He is due here, but on account of sickness he was delayed. He would be in a better position to tell you how we feel than I am.

I would like to mention two items to show how we feel. We had an Association meeting a few weeks ago in the city of Toronto, and it was very helpful indeed and very gratifying to know that we are feeling very much like you are here this morning, judging by the expressions of the various members here, just along the same lines. We are desirous over there of co-operating with the mills to the fullest extent. They have had their innings. So have we. We feel that keenly, and we are now prepared to take it the other way. But we feel we are not prepared to take any landslide. We have the old consumers talking of landslides in all commodities, particularly the paper industry, and we feel it would be a great detriment to the manufacturer as well as the jobber. They have reaped largely as they sowed previously. So have we. But in reaping at all events we have sown, not sown only for the benefit of increasing the demand for paper, but we have given largely of our income, not only to our Government, which requires funds, but to our employees and to other associated charities. All these things have been done in the spirit of kindness, I think. Taking that into consideration, and taking the manufacturers into our confidence, as expressed by one of your members, I think we should get together with them and discuss this matter of closer co-operation between us.

In connection with the wood policy of our country, of which you are well aware, we feel that we have a very large asset, and naturally we feel that we would like more of the manufacturers of your country to come to our country and produce for the merchants' supply. When you refer to the question of reduction in price or establishing a price, we have only learned within a few hours that news print has gone up another cent and a half a pound. I think these are things that show that there are no great hopes for the manufacturer reducing his price.

The question of ground wood. A manufacturer said to me yesterday that his contracts for next year would be one cent a pound advance in his pulp. Now I think we ought to keep all these things in our minds and realize that these advances are coming. At the same time, I would like to indorse what the gentleman said, that we merchants must not consider cancellations. I don't think it is fair to the manufacturer who has laid himself out to take care of us as he has in the past. We got paper from the manufacturers in the United States and Canada as never before. They produced for us not sufficient to meet the demand but sufficient to give us a very good return, and I think we should endeavor to repay the manufacturers to that extent and co-operate with them.

There are many other things I would like to discuss.

THE CHAIRMAN: A year ago last February at New York we had the pleasure of having with us Mr. Monroe from Montreal. I think Mr. Monroe is here today. He gave us a good talk then, and I know he can now. We will hear from Mr. Monroe.

E. S. MONROE: My friend here on my left is smiling at the mistake that the President made in saying that I was from Montreal. I am not from Montreal, I am from Toronto. Montreal is earmarked on our map over there at the present time as being one of the best places to go for a convention or a holiday. (Laughter.)

Mr. President and gentlemen, I assure you that I welcome the opportunity of being here today at your convention. I was very pleased to receive an invitation from your National Secretary when he was over at our convention, saying that you were going to have a convention and would like to have as many Canadians come over as possible. I might say that if I can go back, or if we Canadians can go back with the same information and the same impressions that we received from your convention that we had the privilege of attending last February, it will do our Canadian paper trade a great deal of good, because we all feel that the impressions that we received at your convention at that time were the means of saving the situation in the paper trade in Canada. As you all remember, at that convention nearly every person who came to it came to the convention in the attitude of "We will wait and see what is going to take place." They did not know whether there was going to be a break in price or whether prices were going to be maintained. Fortunately the prices were maintained, and every person went away from that convention with that firm attitude and optimistic view that things were not going to break. We took those impressions over to Canada, and it was the means of saving our situation over there, because, as Mr. Martin has just said, whatever takes place over here is immediately reflected in our market in Canada.

We have a small Association. It extends from Vancouver to Halifax, and in that Association we have every paper merchant in Canada, with the exception of two, as members of our Association, so you will see we are pretty completely organized, and I wish to state we are working closely with the mills today, closer than ever before, and it is only through that close association that we have with the mills that we are going to pull through at this period. I do not feel that we as paper merchants have any right to even think of cancellation of orders. The mills have supplied us and kept us through a period of three or four years, and it was very difficult for them to do so, to supply their very many customers. You have got your share of their goods. They stood by you in that period. You should stand by them, and you should not think of cancellation of orders. The mills will be prepared, no doubt, to assist you if you want to defer shipment for a period. They will do that for you. But give them a fair chance of doing that, and do not think of cancelling orders. The paper merchants have all had a period of three or four years of good business. You can stand two or three months of easing off in the trade. Do not try to force it too hard. If you are going to try to force your business too much at the present time you are going to create those breaks that we want to avoid. We have our Mills Relationship Committee that co-operates with our mills, and just recently we have had them give us a uniform spread on such lines as book paper. They were quite ready and willing to accede to our request, because they are beginning to feel more every day that the paper merchant is their legitimate channel of distribution, and we are working closer along that line today in Canada than ever before. We certainly hope that we shall be able to go back from this convention with the impression that you are going to remain firm, you are not going to have any landslides, because if you have a landslide we shall have it. If you remain firm our market remains firm, too. Thank you.

THE CHAIRMAN: Gentlemen, the next subject to be taken up is "Credit Conditions and Business Expansion." This subject is to be discussed by a young man who has somewhat of an honor thrust upon him. We have four subjects to be considered. Three of them are to be handled by ex-presidents of the Association.

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For the fourth, we have gone out and picked one of the younger generation. Mr. Ward of Philadelphia.

GEORGE W. WARD: Unlike many of the people with whom I have talked, or whose published expressions I have read—I am NOT of the opinion that this country is on the verge of a business collapse.

I believe that the period of business reaction, which, apparently, we have already entered, was as certain to follow the period of unusual expansion as day is certain to follow night. I believe that we are on a much firmer foundation than we were six, eight, or perhaps ten months ago. And I believe that if we keep our heads, conduct our business along safe and conservative lines, eliminating the chances incident to an over-extended condition, we shall not only give ample protection to our business interests as they exist today, but in so doing we shall prepare the basis for conducting a healthy, normal business next year, and the next year, and so on indefinitely.

In direct refutation to any existing impression that the foundations of this country's business are built on the quicksands of a war-time prosperity, allow me to submit a few facts—not theories—that I have come across in the preparation of this paper.

The United States is the richest country in the world. Its bank deposits exceed by billions the combined bank deposits of the whole world outside of this country. Before the war we owed other nations five billion dollars; we have not only paid this debt, but foreign nations now owe us ten billion dollars and we hold the largest gold reserve of any nation in the world.

Of the world's wheat supply we produce 24 per cent.

Cotton	60 per cent
Corn	75 " "
Iron and Steel	40 " "
Gold	20 " "
Silver	40 " "
Coal	52 " "
Copper	60 " "
Oil	66 " "
Automobiles	85 " "

Looking back over the last twenty years I find that the country's population has increased 35 per cent; that the nation's wealth is 5½ times as great, and that the wealth per capita has increased from $1,165 to $4,700. There is twice as much gold in circulation; and the deposits in National Banks have multiplied themselves seven times. Bank clearances have increased from 84½ billion dollars to over 400 billion. The total imports and exports for 1920 exceed 13 billion dollars, six times what they were in 1900. The production of coal, oil, iron, copper, farm products, so forth, have all increased in like proportion.

Now can any man review these figures and still harbor a doubt as to the solidity of American business? It is true that certain commodities have met with severe declines—silk, leather, rubber, cotton, wool,—all of these have been hard hit; but in each case the reaction experienced appeared to be in approximate proportion to the overproduction.

Prices are bound to come down and there is no good reason to believe that paper will be an exception. Can we not look upon the situation as did the Irishman who fell from a fourth story window? As he crashed to the pavement, a passerby hurried to his assistance, and after helping him to his feet inquired as to the extent of his injuries, to which the badly shaken-up Irishman replied: "I'm not much hurt, and besides—I was coming down anyway." And so it is with prices, they are coming down anyway, and knowing that this adjustment is bound to be, it is far more desirable to arrive by way of the stairs rather than to drop from the window like the Irishman.

It is the important duty of each one of us to put our respective houses in order. This means that our inventories must be properly proportioned, and our stocks of merchandise neither too high nor too low. It means that our borrowing should be carefully arranged in order to prevent embarrassment in the event of a temporary lull in sales and collections. And lastly, it means that the granting of credit be confined to only those who actually deserve it, in order to prevent an over-extended condition.

Credit conditions, as they pertain to the relations of the paper merchant and the banker, present no problem—or at least very few—to the merchant who has conducted his business properly. The banker today fully realizes that paper is a very necessary commodity, especially in view of the various preferences granted the industry during the war period. Unlike other important commodities, such as wool, leather, or cotton, paper consumers cannot withdraw from the market. The average man or woman under the press of necessity can go for a considerable period drawing on his or her stock of clothing, or by continuing to have shoes repaired. With paper, it is different. Investigation has shown that except for isolated cases, paper is seldom stocked and as a rule is consumed as quickly as it is bought. Furthermore, the average consumer is forced to resort to a more extensive use of printing paper when in a market that calls for extra sales effort. As a consequence it is apparent that a curtailment in the consumption of paper to any similar degree as in those other lines of merchandise is impossible.

The paper merchant sells three classes of consumers. The first, and by far the largest class, is the printer. Thanks to the very excellent educational work and cost system of the United Typothetae of America, the printer who does not discount is quite the exception to the rule. Taken as a class, he will not be greatly influenced by adverse conditions, even though they should seriously affect his customer. This is due to the fact that his accounts receivable are so widely spread that the individual failure will in no way injure his credit standing to any great extent. During the war, the commercial printer did not buy extensively of printing machinery and he has therefore incurred but little debt in the purchase of equipment, and a great deal of his previous indebtedness has naturally been liquidated in the past four years.

The second class of accounts takes in the publisher, who has been greatly strengthened through the enormous increase in the volume of advertising and a reasonable advance in the rates. In practically all cases the increase in his income has kept pace with the increase in cost of his labor, paper and other items entering into the cost of production. Having once established the new prices, the publisher will hardly be expected to go back to the old inadequate basis, and as the prices of the commodity he uses recede, his margin of net profits will not recede in like proportion.

The third class—those who buy wrapping papers and twine—is interesting only to the houses who handle the coarse papers. This third class represents an excellent credit risk because the average account is not over $100. In the event of accounts of this character getting into difficulties, we all know that it is customary to retire these small claims rather than be bothered with a number of them at a possible creditor's settlement.

If the paper merchant really has any credit problems, they are in his relationship between himself and the paper manufacturer. Before the war, 9 per cent. of the mill purchases were billed at 3 per cent.—30 days from date of arrival at destination. These terms, due to the pressure of a seller's market, were changed to 3 per cent. —thirty days date of shipment, and in some cases even a shorter time was established. There were even instances where the discount rate dropped from three to two per cent., and other instances where purchases were placed on a net basis. As the average time expiring between the date of shipment leaving the mill and its arrival at destination has been twenty-eight days, the paper merchant has practically been paying sight-drafts for his goods—in fact in many localities the sight-draft would have been much more advantageous to him. The paper manufacturers are certainly familiar with the fact that the distributors cannot bill their customers until

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the goods arrive, and having this knowledge they must certainly realize that such terms are a great hardship and a positive injustice to the merchant.

It is my impression that as we return to normal conditions the relations between the manufacturer and merchant will become closer. Indeed, they are becoming closer each year through the co-operation of the American Pulp and Paper Association and the National Trade Paper Association, and it is a reasonable assumption that these conditions, which are certainly not in the best interests of both associations, will undoubtedly disappear.

Reckless prosperity can never become permanent, and a close study of business statistics indicates that every such period is followed by a depression. Likewise, there has never been a period of depression that has not been followed by general business activity and high market prices. In other words, there is bound to be a reaction to both of these abnormal conditions. It is quite apparent that whoever was responsible for the statement that "We cannot stand prosperity" was quite right, for in every case throughout the country's business history a period of prosperity has always been the forerunner of a period of inflation and excessive expansion.

To my mind there is no undue expansion today in the paper industry, and if it exists in the near future to any harmful extent I feel safe in predicting that it will be due to lack of foresight on the part of the paper merchant and the paper manufacturer.

Certainly, it is the duty of every merchant to keep a proper record of merchandise turnover so that his ordering does not mislead the manufacturer in the study of his statistical records which might incorrectly reflect the future consumption possibilities. For instance, if a merchant should take his January, February and March tonnage in the month of January, whether from thought of enhancement in value or for other reasons, and take no tonnage in the months of February and March, it would undoubtedly have a tendency to create a condition of over-production.

The mills would naturally conclude that the order for a three-months' period indicated the market's possibilities for the one month, and consequently a policy that permits ordering in this way is destructive.

The tremendous price decline that has taken place in connection with silk, leather, rubber, cotton and wool would not have been nearly as serious were it not for the combination of over-stock and over-production. I do not believe that this condition would have occurred had the manufacturers and merchants co-operated in determining the market's possibilities, and as a result those commodities are being sold today regardless of cost. Hundreds of concerns who have served well in the past, will be out of business as the price of their lack of foresight, and no one—not even the consumer—will profit to any great extent.

In conclusion, I do not feel that we are in a condition that will show a permanent depression providing ordinary judgment is used. If the distributors do not correctly reflect conditions to the manufacturer, or if in spite of reports indicating the market's absorbative possibilities the manufacturer over-produces, there is a possibility of seriously unsettled conditions in the entire paper trade. I believe, however, that in the year of 1921 there will be consumed and used more paper than in any previous year, and I am sure that the good, sound judgment of the men associated in the paper industry will be able to cope with any unexpected situation that may arise. Of this I am confident.

A NEW PROCESS MAKING PAPER WATERPROOF

Hermann Wandrowsky, a Berlin chemist, has invented a new process by which he claims he can make paper as waterproof as leather. He has obtained a patent on his invention. The new waterproof paper, which he calls Wandrit, is to be used as a substitute for leather, including soles, as a substitute for oilcloth, as a waterproof wrapper and as yarn to be woven into waterproof coats and cloaks, thus supplying the cheapest kind of raincoats.

The inventor, in showing his samples to a number of interested manufacturers and experts, said:

"It has been known for some time that you can make paper waterproof by coating it with cellulose solutions, such as zapon and cellon lacquer. That is, you could make the paper's surface watertight for a time. In other words, the paper had a waterproof coating. As soon as the coating wore off, the waterproof character of the paper had disappeared. When you replaced the thick solution by a thin one, the fluid would penetrate into the paper proper, but it took many baths before the paper would become waterproof. Those many baths involved a heavy loss of valuable solvents that would evaporate during the tedious process of impregnation.

"All those obstacles and difficulties are removed by the process just patented. My invention is based on adding cellulose nitrate or acetate, such as still retain the unmodified structure, in undissolved form, to the paper stock in the pulper, and use the mixture in paper making. The result is a paper which cannot be distinguished from any ordinary product of the paper mill, as far as looks go. After the paper has dried, a small amount of a solvent is applied which causes the added fibers, imbedded between the paper fibres, to dissolve. After the dissolvent has evaporated, the dissolved fibres form an inpenetrable cement holding the paper fibres in its grip. What is thus produced is comparable to a celluloid film in which paper fibres are imbedded. It is flexible, dilatable, smooth and hard to break.

"To still more increase the flexibility of the product certain ingredients may be added which will make it as tough as shoe leather. It may be used in the manufacture of pocketbooks, bags, trunks, harness, book covers, covers on upholstered furniture, etc.

"Wandrit can be produced in any color or shade in the original process of manufacture. It may also be dyed, and the dye will penetrate from the right to wrong side of it. Thus it will not show the bare paper when the surface is worn off. It will be serviceable until the goods themselves are wholly worn through.

"Board is produced in like manner, and will form an excellent substitute for sole leather and even belting. Wandrit made of pure white material will supply the ideal collar and cuff, always clean and ever washable. It is predicted that it will take some time before any collars and cuffs made of Wandrit will show any wear. Wandrit, furthermore, is an excellent substitute for oilcloth. When placed on a table it will look almost like table linen. Cheaper grades can be used as watertight wrapping paper. Harder grades can be formed into bowls and basins, such as are used by photographers.

"Finally, the same process may be applied when spinning yarns are made of paper stock. The fibres in the yarn are dissolved the same as in the case of plain Wandrit. They are then spun and woven. Thus an absolutely waterproof cloth is obtained, the ideal goods for raincoats. These coats can be worn as overcoats as well, and come in handy whenever it rains.

"The dissolvent which evaporates can be collected from the air, converted back into a fluid and used over again, which means an important economy."

Paper Shortage in Spain

MADRID, November 9, 1920.—The leading authors of Spain have sent a petition to the government, asking it to acquire paper for book printing abroad and sell it to the publishers at cost price. Otherwise, they declare, Spanish literature will disappear from the market.

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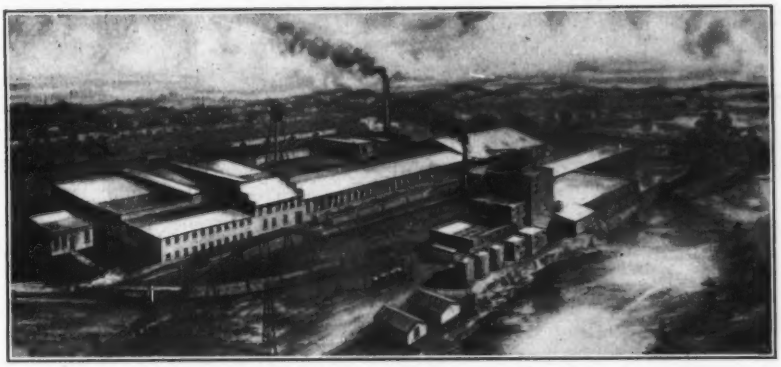

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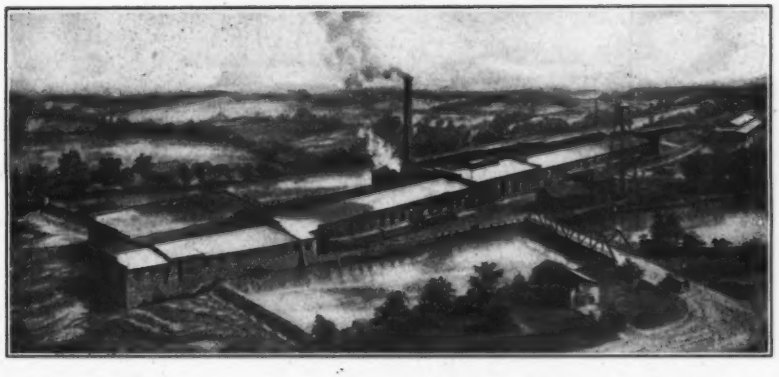

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THE SIZING OF PAPER: A READING LIST

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(Continued on page 112)

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HELSINGFORS, FINLAND

SPAIN
ITALY

THE SIZING OF PAPER: A READING LIST

(*Continued from page* 110)

VON POSSANNER, —.
Commercial paper sizes.
Chem.-Ztg. xxxviii, 100 (1914); C. A. viii, 1345.

VON POSSANNER, —.
Magnesium sulfate as a substitute for alum in the sizing of paper.
Wochbl. Papierfabr. xlii, 2116-2120; C. A. v, 2943.

VON POSSANNER, —.
Behavior of sodium resinate in aqueous solution with varying free rosin content.
Wochbl. Papierfabr. xlii, 2116-2118 (1911); C. A. v, 2945

VON POSSANNER, —.
Stearic acid amide and its properties as a paper sizing material.
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Variation in the saponification number of colophony.
Wochbl. Papierfabr. vliv, 2219-2221 (1913); C. A. vii, 3024.

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Pulp Paper Mag. Can. ii, No. 2, 65-67 (Feb., 1904).

REBS, H.
Detection and determination of rosin size.
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Sizing paper with rosin size and sulfuric acid.
Wochbl. Papierfabr. xl, No. 52, 4441-4444 (Dec. 31, 1909); C. A. iv, 1805.

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Starches and starch products in sizing.
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Acidity and sizing of sulfite cellulose.
Wochbl. Papierfabr. xliii, 4517-4520 (1912); C. A. vii, 1285.

RIESER, C. W.
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ROLE of rosin in sizing.
Paper xvi, No. 1, 22 (Mar. 17, 1915).

ROSIN size analysis.
Paper Making xxv, 91-92 (1906).

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Papier-Ztg. xxv, 110; J. Soc. Chem. Ind. xviii, 368.

ROSIN sizing.
Wochbl. Papierfabr. xxxviii, 1472-1473 (May, 1907); C. A. i, 2634.

ROSIN sizing with hard water.
Pulp Paper Mag. Can. vi, No. 12, 331 (Dec., 1908).

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Determination of rosin in rosin size.
Wochbl. Papierfabr. xlii, 1532-1533 (1911); C. A. v, 2945.

SAMMET, C. FRANK
Detection of faulty sizing.
U. S. Bureau of Chemistry, Circular 107, 3 pp. 1913. J. Ind. Eng. Chem. v, No. 9, 723-735 (Sept., 1913); Paper xiii, No. 1, 17-19 (Sept. 17, 1913); Paper Maker xlvi, 110 (July 1, 1913); 550-552 (Oct. 1, 1913); Paper Mill xxxvi, No. 8, 140; Pulp Paper Mag. Can. xi, No. 5, 165-167 (Mar. 1, 1913); C. A. vii, 1970.

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J. Ind. Eng. Chem. viii, No. 5, 476 (May, 1916); Paper xviii, No. 12, 18 (May 31, 1916).

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Wochbl. Papierfabr. xliii, 3222-3225, 3408-3409, 3489-3491, 3673-3675, 3693-3695, 4148-4150, 4336-4338; C. A. vii. 699.

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Sizing practice.
Wochbl. Papierfabr. li, 575-576 (1920).

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Function of rosin in the sizing of paper.
Paper viii, No. 3, 18, 34 (July 3, 1912).

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Hypothesis of the rosin sizing of paper.
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SCHWALBE, C. G.
Investigation of rosin.
Wochbl. Papierfabr. xxxviii, 1303-1306 (Apr. 27, 1917); C. A. i, 2635.

SCHWALBE, C. G.
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Chem.-Ztg. xxxvi, 896-897; C. A. vi, 3516.

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Sizing of paper.
Papier-Ztg.. xxxvi, 2768-2769.

SCHWALBE, C. G., AND ROBSAHM, H.
The role of alum in the sizing of sulfite cellulose.
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Detection of faulty sizing in high grade paper.
Paper Maker xlviii, No. 4, 566 (Oct. 1, 1915).

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Alum.
Paper Maker xlix, No. 5, 549-550 (May 1, 1915); Pulp Paper Mag. Can. xiii, No. 12, 343-344 (June 15, 1915).

SCOTT, JAMES.
Rosin.
Paper Maker xlix, No. 6, 671-672 (June 1, 1915); Paper xvi, No. 18, 13-14 (July 14, 1915).

SELECTION of alum for sizing.
Paper vii, No. 1, 25 (Mar. 20, 1912).

(*Continued on page* 114)

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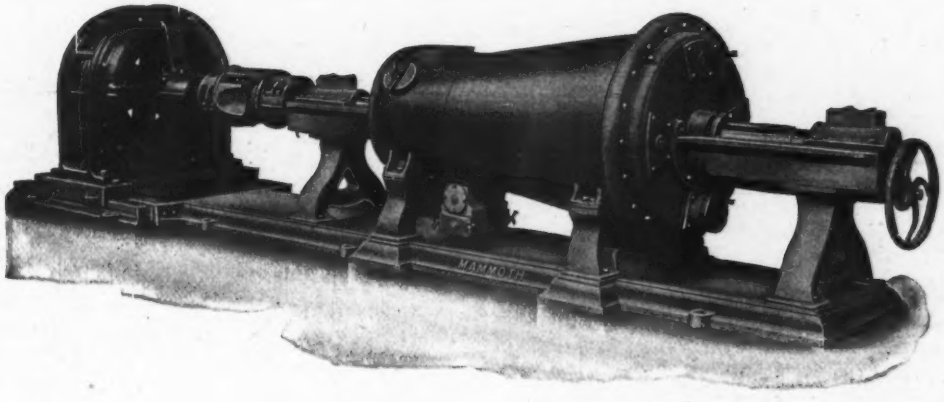

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THE SIZING OF PAPER: A READING LIST

(*Continued from page* 112)

SELECTION of alum for sizing.
Paper Maker xlvii, 587 (Apr. 1, 1914).

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Influence of animal size upon the physical properties of paper.
Pulp Paper Mag. Can. ii, No. 4, 304-305 (Oct., 1904).

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Substitutes for alum in sizing.
Papierfabr. xiv, No. 9, 133-137 (Mar. 3, 1916); C. A. x, 2404.

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Pulp Paper Mag. Can. i, No. 3, 79-80 (July, 1903).

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Examination of commercial gelatins with regards to their suitability for papermaking.
Analyst xxxix, 20-27 (1914); C. A. viii, 1667.

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Niter cake and rosin size.
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Pulp Paper Mag. Can. xii, No. 9, 267 (May 1, 1914).

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Pulp Paper Mag. Can. xi, No. 10, 354 (May 15, 1913).

SIZING of papers.
Papierfabr. xii, No. 34, 963-968 (Aug. 21, 1914); No. 35, 975-980 (Aug. 28, 1914); No. 36, 987-991 (Sept. 4, 1914); No. 37, 999-1001 (Sept. 11, 1914); C. A. ix, 245.

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Wochbl. Papierfabr. xxxviii, 242 (Jan., 1907); C. A. i, 2488.

SIZING of printing paper without rosin.
Wochbl. Papierfabr. xxxviii, 2868-2869 (Aug., 1907); C. A. ii, 319.

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Dingler's polyt. J. cclxxix, 298-300; J. Soc. Chem. Ind. x, 847.

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Pulp Paper Mag. Can. xi, No. 10, 355 (May 15, 1913).

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Paper xvi, No. 1, 21-22 (Mar. 17, 1915); C. A. ix, 1390.

SIZING troubles.
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SIZING without rosin.
Papier-Ztg. xxxii, 2810 (Aug., 1907); C. A. i, 2488.

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Papier-Ztg. xxiii, 2025 (1898); J. Soc. Chem. Ind. xviii, 788.

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Papier-Ztg. xxxii, 3829 (Oct. 31, 1907); C. A. ii, 589.

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Content of rosin size solutions.
Paper xxv, No. 3, 26 (Sept. 24, 1919); C. A. xiii, 2761.

SOURCES of rosin specks in paper.
Paper xvi, No. 2, 18, 32 (Mar. 24, 1915).

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Stearinamide as a size for fine paper.
Papier-Ztg. xxxiii, 1487 (May 10, 1908); C. A. ii, 2449.

STARCH for use in paper making.
Paper i, No. 11, 11, 19 (Nov. 30, 1910).

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Sizing of paper with water soluble colloids obtained from sea tang.
Wochbl. Papierfabr. xliv, 1515 (1913).

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Use of niter cake in papermaking.
J. Soc. Chem. Ind. xxxvii, No. 8, 128 T (Apr. 30, 1918); Paper xxii, No. 14, 383 (June 12, 1918).

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Wochbl. Papierfabr. 1920, 39; Paper xxvi, No. 1, 1-2 (1920).

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SUBSTITUTES for rosin.
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Proper order of adding furnish to beaters.
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Absorption of aluminium by fiber.
Pulp Paper Mag. Can. xi, No. 24, 803-804 (Dec. 15, 1913).

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Paper xix, No. 7, 11-12 (Oct. 25, 1916).

TESTING and improving rosin size.
Paper v, No. 13, 12, 32 (Dec. 13, 1911).

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Pulp Paper Mag. Can. i, No. 6, 167-169 (Oct., 1913).

TESTING for rosin glue and casein sizing.
Pulp Paper Mag. Can. vii, No. 1, 44-46 (Jan., 1909).

TESTING for sizing with iodine.
J. Ind. Eng. Chem. xi, No. 10, 972 (Oct., 1919); Paper xxv, 1106; Paper Maker lv, Intern. No. 43 (1918-1919).

TESTING paper for glue sizing.
Pulp Paper Mag. Can. vii, No. 10,289-290 (Oct. 1909); Paper Making xxviii, No. 3, 91 (Mar., 1909).

TESTING talc for paper sizing.
Pulp Paper Mag. Can. xi, No. 10, 338 (May 15, 1913); C. A. vii, 2306.

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Paper xiv, No. 8, 19 (May 6, 1914).

TO DETECT animal size in paper.
Paper iv, No. 9, 28 (Aug. 16, 1911).

TO PREVENT the foaming of sizings.
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TO PREVENT the foaming of sizings.
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TRAQUAIR, JOHN.
Colloidal rosin in beater sizing.
Paper xxvi, No. 5, 185-186 (Apr. 7, 1920); C. A. xiv, 2083.

TRAQUAIR, JOHN.
Function of starch in paper.
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TRAQUAIR, JOHN.
Function of starch in beater sizing.
Paper Maker lvi, No. 5, 444 (Nov. 1, 1918); Paper xxi, No. 23, 68, 70 (Feb. 13, 1918); Tech. Assoc. Papers, I, 43 (1918).

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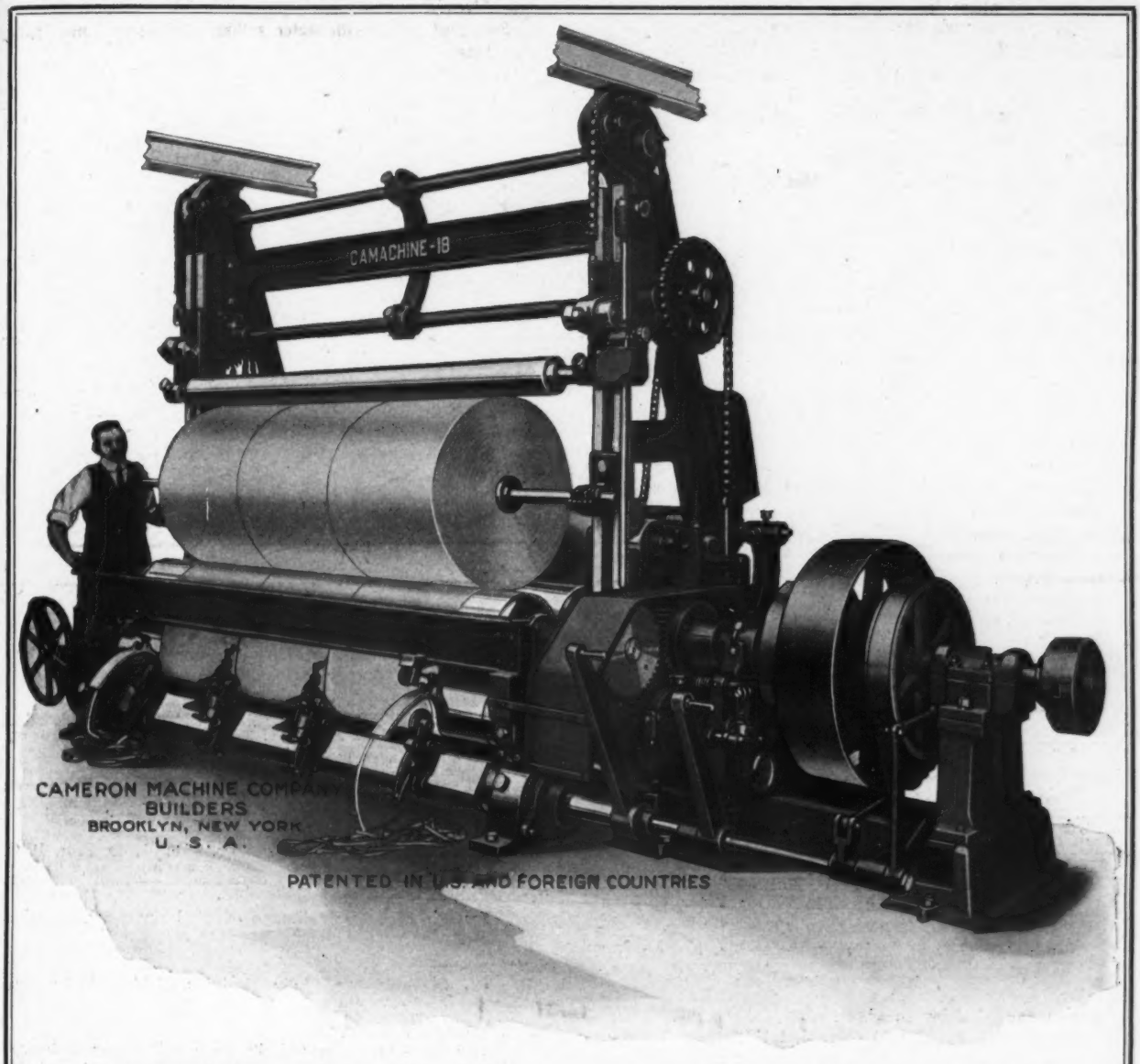

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THE SIZING OF PAPER: A READING LIST

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TRAQUAIR, JOHN.
Starch and starch sizing in papermaking.
Paper xxvi, No. 3, 93-96 (March 24, 1920); C. A. xiv, 2083.

USE of casein in sizing.
Papierfabr. x, 1065, 1093, 1121 (1912).

USE of rosin size with feculose.
Paper Maker 1, 616 (Dec. 1, 1915).

USE of sulfate of magnesia.
Paper v, No. 1, 28 (Sept. 20, 1911).

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New theories of vegetable sizing.
La Papeterie, 1911, special No., 81-88.

VAINS, A. DE
Sulfate of alumina in the sizing process.
Paper iv, No. 13, 11 (Sept. 13, 1911).

VORABERGER, ALEX. R.
Most suitable paper sizing.
Papier-Ztg. xxxix, No. 40, 1343-1344 (May 17, 1914).

WAGNER, PAUL
Paper testing.
Wochbl. Papierfabr. xlvi, 235-238, 425-428, 621-623, 659-660 (1915); C. A. x, 525.

WAR TIME substitutes.
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WEICHETT, A.
Deodorizing certain sized papers.
Papier-Ztg. xxvi, No. 61, 2299 (1901); J. Soc. Chem. Ind. xx, 1014.

WERNER, EGMONT.
Chemistry of papermaking. Rosin.
PAPER TRADE JOURNAL xlvi, No. 18, 42, 46 (Apr. 30, 1908).

WHAT MANY do not know.
Papierfabr. xvii, No. 31, 788-789 (1919).

WOOD ROSIN for papermaking.
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Paper Maker lv, Intern. No., 46 (1918-1919).

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Corn starch as sizing for writing paper.
Wochbl. Papierfabr. xliii, 1004 (1912); Paper vi, No. 13. 15 (1912); Wochbl. Papierfabr. vliv, 835-841; No. 23, 2077-2078; No. 25, 2406-2407 (1913); Papier-Ztg. No. 27-28, 995, 1027 (1913).

WREDE, H.
Question of sizing paper.
Paper v, No. 7, 23-24, 30 (Nov. 1, 1911).

WUNDER, J.
The sizing of paper.
Chem.-Ztg. xv, 702-703 (1891); J. Soc. Chem. Ind. xi, 52.

WURSTER, C.
Use of sodium bisulfate in paper sizing.
Papier-Ztg. xxviii, 1896-1897 (1903); 5th. Intern. Congr. Appl. Chem. II, 692-693 (1903); Pulp Paper Mag. Can. i, No. 5, 141 (Sept., 1903); J. Soc. Chem. Ind. xxii, 878.

WYATT, J. W.
Sizing paper with rosin.
Proc. Inst. Civil Eng., 1887, paper 2285; J. Soc. Chem. Ind. vii, 132.

ZSCHOKHE, BRUNO.
The yellowing of paper.
Wochbl. Papierfabr. xliv, 2976-2981, 3165-3168; C. A. vii, 3661.

APPENDIX.

The following list of abbreviations are in addition to those already published as an appendix to Contribution No. 16:

ANALYST.
Analyst, The. Simpkin, Marshall, Hamilton, Kent & Co., Ltd., 2, 4, 6, 8, Orange St., Leicester Square, London, W. C. 2, England.

CHEM. IND.
Chemische Industrie, Die. Weidmannsche Buchhandlung, Zimmerstr. 94, Berlin, S. W., Germany.

CHEM. REV. FETT-HARZ-IND.
Chemische Revue ueber die Fett und Harz-Industrie. Holland & Josenhans, Lindenstrasse 13, Stuttgart, Germany.

CHEM. TRADE J.
Chemical Trade Journal and Chemical Engineer, The. 265 Strand, London, W. C. 2, England.

CHEM. WORLD.
Chemical World, The. J. & A. Churchill, 7 Great Marlborough St., London, England.

CHEM.-ZTG.
Chemiker-Zeitung. Otto v. Halem, Cöthen, Germany.

DINGLER'S POLYT J.
Dingler's polytechnisches Journal. Richard Dietze, Verlagsbuchhandlung, Berlin, W. 66, Germany.

MITT. KGL. MATERIAL.
Mitteilungen aus dem königlichen Materialprüfungsant zu Berlin-Lichterfelde West. Julius Springer, 23-24 Link-Str., Berlin W. 9, Germany.

MITT. TECH. GEWERBE.
Mittheilungen des technologischen Gewerbe-Museums. Section für Holz-Industrie, Vienna, Austria.

PAPER AND PULP.
Paper and Pulp. Clayton Beadle and H. P. Stevens, London, England.

PAPER INDUSTRY.
Paper Industry, The. Edward B. Fritz, 356 Monadnock Block, Chicago, Ill.

PAPER MILL.
Paper Mill and Wood Pulp News, The. L. D. Post, P. O. Box 592, New York City.

PROC. INST. CIVIL ENG.
Proceedings of the Institution of Civil Engineers. London, England.

SEIFENFABR.
Seifenfabrikant, Der. Julius Springer, 23-24 Link-Str., Berlin W. 9, Germany.

TECH, ASSOC. PAPERS.
Technical Association (of the Pulp and Paper Industry) Papers. Thomas J. Keenan, Secretary, Technical Association of the Pulp and Paper Industry, 542 Fifth Ave., New York City.

Empire State Forest Products' Meeting

The fifteenth annual meeting of the Empire State Forest Products Association will take place in Utica on Thursday, December 2, at the Hotel Utica. The general subject of the addresses will be a State Forest Policy, and it is urged that all timberland owners and operators in the State of New York, whether members of the Association or not, attend the meeting in order that a definite policy of forestry for the State of New York may be agreed upon by those principally interested therein. There will be the usual banquet in the evening. The business to be transacted includes the election of officers and directors.

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CANADIAN BUSINESS ABROAD HELD UP BY POOR CONDITIONS

Banks Are Very Chary About Commitments to Various Foreign Countries Because of the Uncertain Financial Conditions in the Particular Countries—Representatives of Swedish Paper Mills Visit Canada and the United States to Keep Themselves in Touch With Developments on This Continent—Clarke Bros. to Make Fibre Shipping Cases—Nova Scotia Mill Nears Completion.

[FROM OUR REGULAR CORRESPONDENT.]

MONTREAL, Que., November 15, 1920.—Although the pulp and paper industry is possibly the least affected of any industry by the financial conditions now prevailing, still the unsettled outlook is having its effect: For instance, the paper companies in Canada have been doing business with India, Australia, Cuba, South Africa, and some of the South American republics, and still more business is offered. But this business is now being held up owing to the uncertain financial conditions in these particular countries. The banks are very chary in regard to commitments in these countries. The reason is that all these countries have been sending enormous quantities of exports to London and London is not buying at the present time. Some shipments of paper that would otherwise go forward are being held up as a consequence.

Swedish Paper Men Looking Over the Field

Recently representatives of the Canadian paper mills visited Sweden and other Scandinavian countries with a view to seeing what position the paper mills there were in, and the prospects of their re-entering the world's markets. During the past week or so, representatives of Swedish mills have been visiting Canada and the United States to keep themselves abreast of developments on this continent, and incidently look over the field, with a view to taking advantage of the American market. These representatives are Carl Wahren and Alfred Bywall, managing director and superintendent, respectively, of the Holman Company, the largest news print manufacturers in Sweden. In Montreal these gentlemen were entertained by G. F. Steele and other officials of Canadian Export Paper Company, and they also visited the paper mills at Grand 'Mere, Shawinigan Falls, Berlin, N. H., and Millinocket, Me. They expressed themselves as greatly impressed with Canada's resources and also expressed astonishment at the enormous quantities of wood at Shawinigan Falls and Millinocket. It is understood that they hope to increase their trade with the United States.

New Paper Mill for Glen Falls, N. B.

A. C. McIntyre, formerly of Montreal, president of Clarke Bros., Limited, Bear River, N. S., has announced that his company has concluded the purchase of the large building at Glen Falls, formerly used by the Ford Motor Company, of Canada, and owned by Hon. William Pugsley, Lieutenant-Governor of New Brunswick. The building, which is one of the most modern structures of its kind in Canada, with railway connection, is to be used by the new owners for the manufacture of fibre shipping cases. The pulp will be brought from the large plant of the Clarke Brothers, at Bear River, across the Bay of Fundy, landed at this port and taken to the Glen Falls plant immediately. Preparations for the installation of the new machinery will begin next Monday. The machinery will be installed by January, and the manufacturing will be well under way by the first of May. Then twenty men and girls will be employed.

In addition to this industry, the company of which Mr. McIntyre is president, is to build a paper mill at the Glen Falls site, for the manufacture of heavier grades of paper, and this mill, the construction of which will be started in the spring, will employ one hundred more hands. Daniel MacLarety, superintendent of the J. R. Booth mills in Ottawa, and a leading expert in his line of business, has been appointed superintendent of the St. John industry and will come here soon.

Altogether, Mr. McIntyre said, the new industry will be the biggest thing of its kind in Canada. A large part of the company's market will be in England and Australia, and there will consequently be much shipping of their output from this port. A large number of butter boxes will be sent to Australia. The company considers the situation an admirable one for its business, particularly in view of the fact that it will be able to secure hydro-electric power as a result of the local government's water power development plants.

The paper mill company, to do business here has been capitalized at $5,000,000, and Hon. Mr. Pugsley is to be a member of the board of directors. The main company is under the following board: A. G. McIntyre, president; W. G. Clarke, chairman and treasurer; W. W. Clarke, secretary; Charles T. Starke, of John Starke & Co., Toronto; H. A. Green, managing director of the Banker's Bond Company, Toronto; Alexander Fasken, a director of the Provincial Paper Mills directors. Mr. Fasken is the company's solicitor.

Nova Scotia Mill Nears Completion

The new buildings which Clarke Brothers, Limited, have had under way at Bear River, N. S., are now nearing completion and the machinery is being rushed forward and set up as fast as it arrives. The company was much hampered last fall on account of the wet season and on account of the extreme cold winter, which was the severest experienced in the last forty years, and which prevented the carrying on of the work for four months' time.

W. G. Clarke, the chairman of the board, points out that the enlargements now under way should double the profits of the company.

"As far as our pulp mill is concerned," he adds, "the delays have been beneficial to the company, for during this period the permanent shortage in kraft pulp has become more accentuated, and has brought home to us more forcibly the wisdom of increasing the output of our mill. During this same period there have become available certain rights and improvement in the manufacture of kraft pulp, which the board fortunately has been able to acquire and which will greatly enhance the quality of the output of the mill. The original mill was at the rate of thirty tons per day. The extension we are now installing with the additional equipment which we have purchased, will give us a capacity of fifty tons per day. Although we have been able to almost double the capacity of our mill, we only found it necessary to increase our indebtedness by $250,000, making our total indebtedness $1,250,000, which will more than complete these additions and improvements and provide such working capital as is required to carry on under this intended programme. The additional finances have been arranged."

Riordon Brothers' Profits Increased

Profits of the Riordon Company, Limited, for the first quarter of the fiscal year, July 1 to September 30, are stated to be in excess of $1,600,000. At the time the company was formed, the estimated earnings were at the rate of $5,000,000 per annum, while the present showing would indicate earnings in excess of $6,000,000 for the year.

The company is favorably situated in respect to its market, as it is understood that the market for pulp shows every indication of strengthening around the end of the year, especially for bleached sulphite pulp.

(Continued on page 120)

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Obituary

Arthur F. Robertson

RICHMOND, Va., November 11, 1920.—Arthur F. Robertson, who for fifteen years has been secretary and treasurer of the Albermarle Paper Manufacturing Company, and who has been connected with the company in various capacities for twenty-nine years, died yesterday at the Johnston-Willis Hospital in this city, after a very brief illness. Mr. Robertson was honored and beloved by all of his business associates. His long connection with the paper trade won for him many friends throughout the country, and he was greatly esteemed by all who knew him because of his noble character and business integrity.

CANADIAN BUSINESS ABROAD

(*Continued from page* 118)

Carl Riordon, president of the Riordon Company, Limited, when seen in reference to the report that prices would shortly be increased for bleached sulphite pulp, made the announcement that the market for bleached sulphite is in a very healthy condition. Mr. Riordon also stated that the company is now accepting contracts for 1921 at prices equal to the highest contract prices received in 1920.

Saguenay Company Doing Well

It is stated here that earnings of the Saguenay Pulp and Power Company, Limited, are running away ahead of expectations, the net for the first nine months being in excess of $3,000,000, indicating full $4,000,000 for the year. The improvement is a result of higher prices both for groundwood and sulphite pulp, as well as to a liberal saving in the operations of the Chandler sulphite mill, where it is said that a saving in coal consumption of as much as 50 tons per day has been made.

A further rumor associates the company with Price Brothers in a possible merger through which could be settled the dispute regarding certain water powers, besides which other economies would be effected. It will be remembered, however, that Sir William Price recently denied that the company were concerned in any merger negotiations.

Dryden Paper Company Makes Good Showing

Dyrden Pulp and Paper Company, one of the latest pulp and paper reorganizations on the market here, is reported to be making an excellent showing. Current returns from the mills indicate that the company is at present earning at the rate of $6 per share on its common stock, after making allowance for interest on bonds and debentures.

Production is in excess of the amount estimated at the time of the recent stock issue. As the capital of the company consists of 100,000 shares of common stock, the earnings at the present rate would amount to fully $600,000 per annum.

The output mentioned is on the basis of existing plant, without taking into consideration the improvements and extensions which are to be carried out through the expenditure of the new capital and which are to double the output of the company. The company's products consist of kraft pulp and paper, boxboard and building paper, for all of which a large and growing market exists in the Canadian West and the Central States.

Six New Machines for Wayagamack

Plans for the extension of the kraft paper capacity of the Wayagamack Pulp and Paper Company of Three Rivers, Que., are well under way, although serious delays have occurred in the making of the machines in England. One of these is on the water and a second one is promised before the close of navigation. These two will be in operation early in the spring and will increase the output by fifteen tons a day each of the kraft paper. Then four more will be received some time, it is expected, before the middle of 1921, which, with an increase of the capacity of the present machines by some twenty tons a day, will give an added production of 100 tons, or a total of paper of 175 tons a day. The pulp machines will be increased in capacity to provide sufficient for the new machines, and still leave the present surplus for sale of about 110 to 115 tons a day.

The special meeting of the shareholders called for December 9 will receive the recommendation of the directors for a doubling of the shares from 50,000 to 100,000, and at the same time an announcement may be made as to the price at which the additional 50,000 shares will be offered to holders of stock.

Bids for Government Paper

[FROM OUR REGULAR CORRESPONDENT.]

WASHINGTON, D. C., November 17, 1920.—The purchasing officer of the Government Printing Office will open bids on November 22 for 15,400 pounds (100 reams) of 38 x 48—154 pounds double-coated book paper.

The purchasing officer of the Government Printing Office has received the following bids for 56,100 pounds (550 reams) of pink, melon, buff, Quaker drab, green and gray, 21x31—102 pounds, Bristol board: R. P. Andrews Paper Company, at 16½ cents per pound; The Old Dominion Paper Company, at $.1898.

125,000 pounds of 22½ x 28½—100 pounds yellow Bristol board; Champion Coated Paper Company, at 16½ cents per pound; Mathers-Lamm Paper Company, at $.1395, and R. P. Andrews Paper Company, at 16½ cents.

Bids will be opened at the printing office on November 19 for 39,550 pounds (1300 reams) of various sizes, white and yellow writing paper and for 7,650 pounds of 21 x 31—102 pounds, yellow Bristol board.

The purchasing officer of the Government Printing Office will open bids on November 19 for 3,600 pounds (200 reams) 16 x 21—No. 20, Fine White Glazed Bond Paper; 10,000 pounds (200 reams) 25 x 38—50 pounds, White Antique Printing Paper.

The Whitaker Paper Company has been awarded the contract by the Purchasing Officer of the Government Printing Office for furnishing 60,000 pounds (2.000 reams) of 21½ x 32½—No. 16 high M. F. white writing paper at $.1585 per pound, bids for which were opened on November 1.

The Southworth Company will furnish 1,775 pounds of 18 x 23—No. 32 white ledger paper at $.44 per pound, bids for which were opened on November 3.

The Purchasing Officer of the Government Printing Office has received the following bids for 53,750 pounds (1,100 reams) of white and blue writing paper; Whiting-Patterson Company, at $.27½ and $.27½; Carew Manufacturing Company, at $.25 and $.26; Aetna Paper Company, at $.2783 and $.2884; Old Dominion Paper Company, at $.2624, $.2424 and $.27 (for white) and $.2724, $.2524 and $.27 (for blue); Dobler & Mudge, at $.24½ and $.23½ (for white) and $.25½ and $.24½ (for blue); Maurice O'Meara Company, at $.23 for white; Graham Paper Company, at $.27 and $.28; D. L. Ward Company, at $.387 and $.399; American Writing Paper Company, at $.2787 and $.2887; and Strathmore Paper Company, at $.31 and $.32.

5,050 pounds (100 reams) of 21 x 32—No. 28 white ledger paper; American Writing Paper Company, at $.449 per pound; Carew Manufacturing Company, at $.47; Whitaker Paper Company, at $.4465; Strathmore Paper Company, at $.43; and R. P. Andrews Paper Company, at $.45.

1,095 pounds of 21 x 32½—No. 60 green ledger paper; R. P. Andrews Paper Company, at $.47 per pound; and Carew Manufacturing Company, at $.50.

Bids will be opened at the Printing Office on November 19 for 1,000,000 pounds of 22 x 28—100 pounds, green Bristol board.

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EDDY MILL AT THREE RIVERS NOW NEARING COMPLETION

The Great Plant, When Completed, Will Be Equipped With Four Cylinder Board Machines—The First Machine, Already Installed and in Successful Operation, Is 320 Feet Long and 126 Inches Wide—An Exact Duplicate of the Machine Is Completed and Will Be Delivered and Installed in December—In Fifteen Years Its Capital Has Increased from $18,500 to $10,000,000.

[FROM OUR REGULAR CORRESPONDENT.]

KALAMAZOO, Mich., November 15, 1920.—With every available workman possible to secure hustling on the job, Contractor H. L. Vanderhorst is making strenuous efforts to get the mammoth stock house of the Eddy Paper Company's Three Rivers plant enclosed before winter sets in. The storage space is badly needed at this time, for with the big machine in operation, great supplies of raw material must be housed to secure an unbroken production of the finished container board, the chief product of the new mill.

The new stock house will be strictly fireproof, only reinforced concrete and brick being used in the construction. It is to be 162 by 372 feet in dimensions, partially three floors and partially five floors in height. The second unit, which will be erected immediately on the completion of the present structure, will be 140 by 372 feet in dimensions, thus providing a storage plant, 302 by 372 feet over all and with a total of approximately 500,000 square feet of floor space, the largest structure of the kind in the Middle West.

What the New Plant Will Be Like

The great plant of the Eddy Paper Company has progressed far enough in construction to give a fair idea of its ultimate magnitude and proportions. The architectural and engineering work was done by Billingham & Cobb, of Kalamazoo, and insures a mill in every way modern and efficient. All the buildings are strictly fireproof, brick, reinforced concrete and steel being used exclusively. Additional protection against fire hazard is provided through a sprinkler system, the Grinnell head type and installed by the United States Construction Company. The sprinklers are reinforced by a 100,000-gallon steel water tank, elevated 150 feet.

To Have Four Cylinder Board Machines

The mill proper, when completed, will be equipped with four cylinder board machines. The first unit of the machine room, 312 by 80 feet in dimensions, will be followed by a structure of like size and proportions. The first machine installed and now in successful operation, is 320 feet long and 126 inches wide. It is equipped with seven cylinders and an eighth can be added later if so desired. This machine has 103 dryers and is further equipped with the Sturtevant absorption system, which greatly assists in the drying processes. This mechanical leviathan was manufactured by the Beloit Iron Works and has production capacity of 100 tons of container board every 24 hours.

An exact duplicate of this machine is completed and will be delivered and installed in December.

Eight Beaters to Each Machine

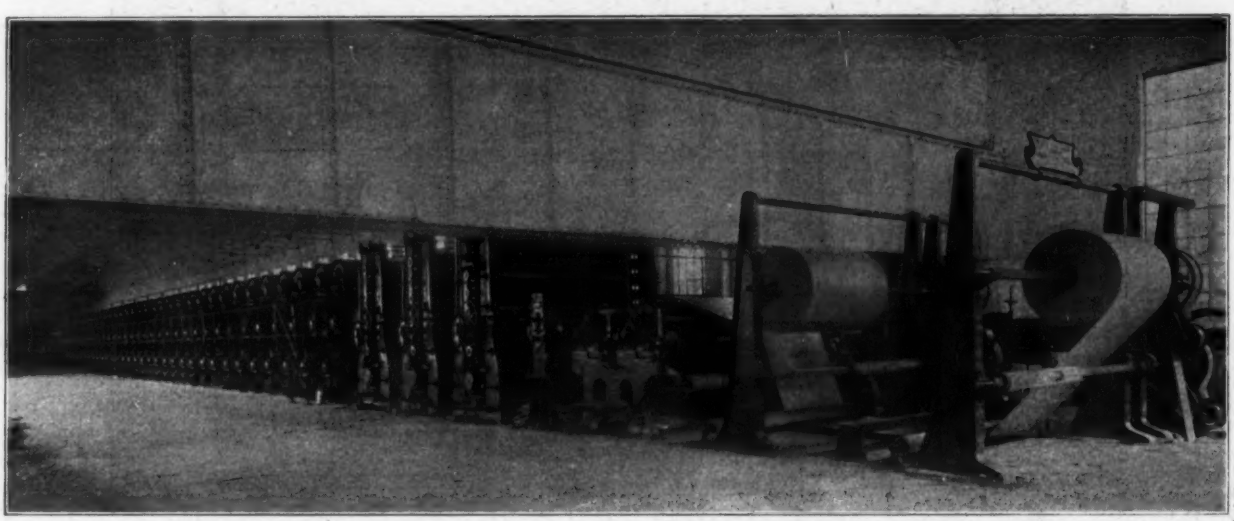
Provision is made for the installation of eight beating engines to each machine, or ultimately 32 in all. Sixteen 1,800-pound Dilts beaters are in the first unit. These beaters are electrically driven, a motor operating two beaters. There will also be 16 Shartle Brothers jordans, four to a machine, each jordan being direct connected to a motor. The present beater room, 80 by 210 feet in dimensions, is to be enlarged to 80 by 310 feet to accommodate equipment for the four machines. The jordan room is 40 by 100 feet and is to be doubled in size.

The finished container board is to be handled exclusively by overhead cranes and will be stored in the roll room, a spacious warehouse, 80 by 200 feet in size, and nearly 30 feet high. It is to be extended in length by 100 feet.

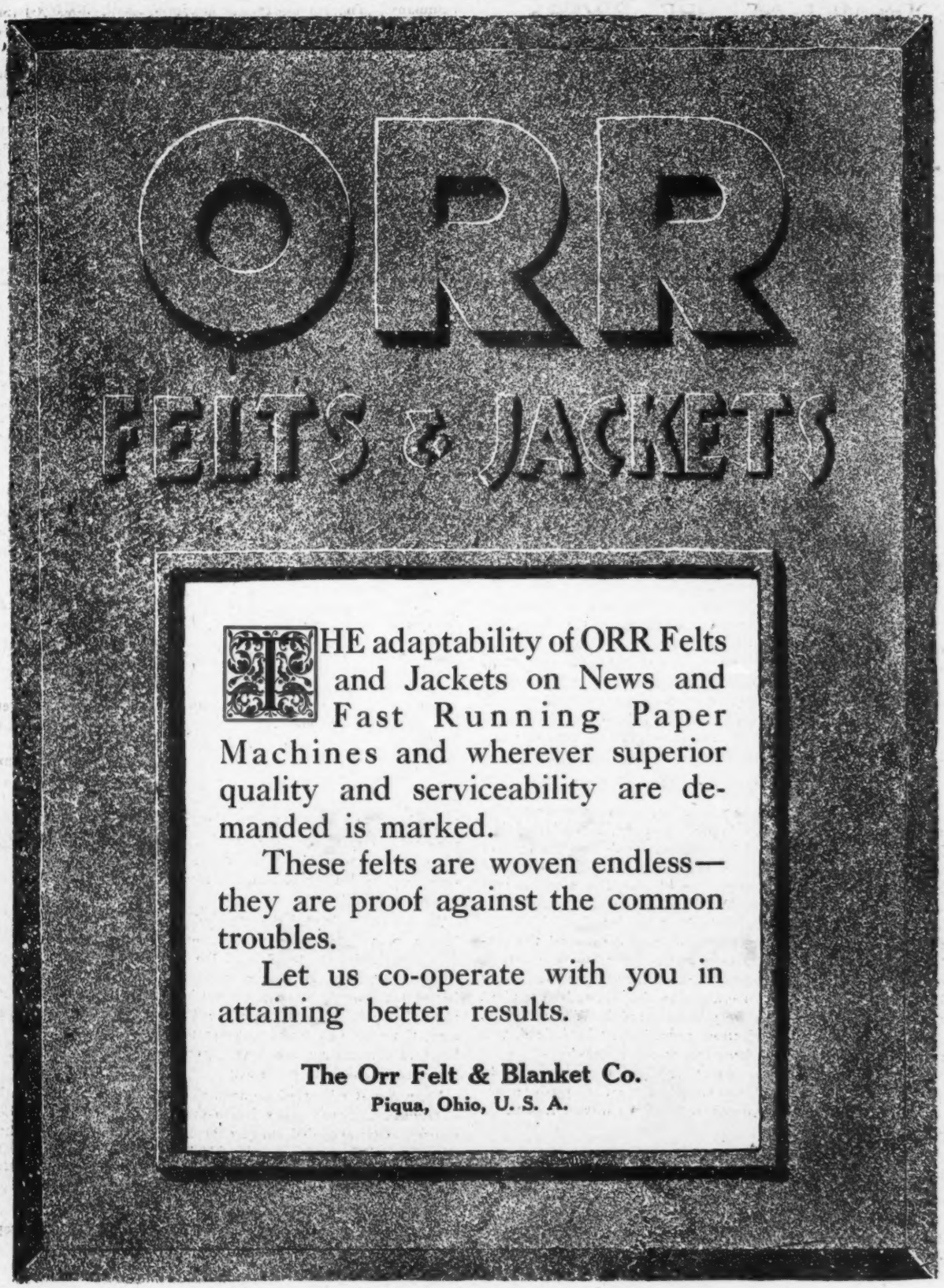
It is from this department the board passes into the great container box plant, 300 by 342 feet in dimensions. This division has a 114 and a 72-inch paster, two Swift machines, which in a single operation slits, cuts and creases the board. They consume 80 tons of finished board a day.

To Be Electrically Driven

Every bit of machinery in the mill will be electrically driven, the juice being generated in the company's power plant. The turbine room is 44 by 112 feet in dimensions and houses a 2,000-horsepower General Electric steam turbine, also an auxiliary 125-horsepower turbine, which will be used to operate



126-INCH CYLINDER MACHINE INSTALLED IN THE NEW PLANT OF THE EDDY PAPER COMPANY. IT IS 320 FEET LONG, HAS 103 DRYERS AND SEVEN CYLINDERS. A DUPLICATE OF THIS MACHINE HAS BEEN ORDERED FROM THE BELOIT IRON WORKS.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Recent Incorporations

CALIFORNIA PAPER GOODS COMPANY.—Capital stock, $250,000. Directors, P. J. Moseley, R. B. Atwell, J. L. Moon, H. F. Prince, S. M. Haskins.

FRONTIER WOOD PULP CORPORATION, Lockport, New York.—Manufacturing wood pulp or paper, etc.; capital, $125,000. Incorporator: F. W. Roberts, Lockport, N. Y.

TEHUANTEPEC LAND & LUMBER CORPORATION, Dover, Delaware.—To own and cut timber lands; capital, $1,250,000.

INTERNATIONAL PULP & PRODUCTS CORPORATION, Wilmington, Delaware.—Manufacture and sale of the products of annual plants; capital, $10,000,000.

EDDY MILL NEARLY COMPLETED

(*Continued from page* 122)

the container plant if the big turbine is shut down. The boiler house will have a battery of nine 300-horsepower Wickes boilers and three more will be added later. Murphy stokers, Green fuel economizers and Foster superheaters complete the equipment. A highly efficient coal handling system adds to the economy of the power plant. There is a concrete coal storage pit, 100 by 206 feet in dimensions, with a capacity of 10,000 tons of coal. A well planned and equipped machine shop, 40 by 120 feet in dimensions, is one of the conveniences of the big plant.

Future Development Plans

The future development plans of the company call for the erection of a commodious office building on the main thoroughfare approaching the plant. There will also be a fine boarding club, capable of accommodating about 50 of the male employees. The company also contemplates wrecking the old mill and erecting a new brick structure over the equipment now in regular use. In this connection, Charles E. Nelson, secretary and general manager of the company, related an interesting story to J. C. Hayward, who is handling the men of the Eddy Paper Company at this time, and a representative of the PAPER TRADE JOURNAL, who visited the plant together.

An Interesting Story

"The 80-inch machine in use in the original Eddy plant was purchased from the French Paper Company, Niles," said Mr. Nelson. "It was purchased by the late Jacob Gumbinsky and his son, Oscar, for junk. On inspection it was found good enough to be rebuilt and used in a plant. The machine was installed here in 1906 and has been in constant use since, though of course completely rebuilt in the interim.

"The original foundation, all wood, rotted out and the machine was dismantled and stored out of doors while we built concrete piers for its support. It was at that time that Oscar Gumbinsky suggested that we abandon the Three Rivers plant and move the machine to the mill acquired in White Pigeon. I entertained a serious objection, remarking, 'No, indeed, this is the lucky spot and right here this machine stays.'

"By concentrating on specialties for which there is a steadily growing demand, the old machine has been a steady profit maker and is still good enough so that we intend to build a new home for it."

Financial History of the Company

At the present time the Eddy Paper Company has complete conversion plants from raw material to printed paper packages at Three Rivers and White Pigeon, operating at those places three box board mills, two carton and shipping container factories and coating mill for making clay coated boxboards. The board mills now in operation produce 200 tons every 24 hours, and with the installation of the three machines ordered the total daily production will be 500 tons.

The financial history of the Eddy Paper Company is even more impressive reading than the account of its industrial growth. This concern celebrates its 15th birthday January 30, 1921. In the comparatively brief period of a decade and a half, the paid in capital has increased from $18,500 to approximately $10,000,000, or 540 times the original amount. In addition to the payment of generous cash dividends, the company has also been able to declare five stock dividends, aggregating 535 per cent on the stock totals at the various periods when these dividends were so declared.

Kalamazoo Vegetable Parchment Co. Meets

[FROM OUR REGULAR CORRESPONDENT.]

KALAMAZOO, Mich., November 15, 1920.—Consolidation of the Kalamazoo Vegetable Parchment Company and the Glendale Pulp and Paper Company was perfected at a stockholders' meeting held Friday afternoon, November 12, in the Welfare hall of the Parchment Company.

By the terms of the agreement reached the latter company passes out of existence, being absorbed by the Kalamazoo Vegetable Parchment Company.

Reports offered at the meeting showed that the present paid in capital of the Kalamazoo Vegetable Parchment Company was $1,000,000 with a surplus of over a million in addition. Of the surplus, $850,000 was converted to capital stock and a stock dividend of 60 per cent was paid to Vegetable Parchment stockholders. The remaining $250,000 of new stock was used to acquire the assets of the Glendale Pulp & Paper Company, on the basis of share for share.

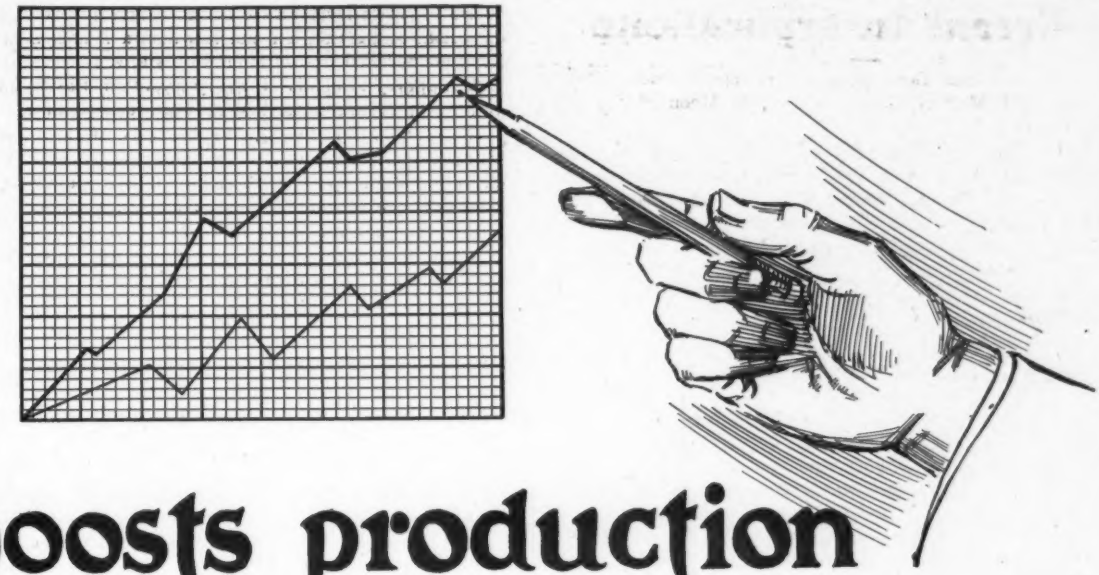
It was then voted to increase the gross capital of the combined concerns to $3,000,000 by the issuance of $1,150,000 more stock. This will be offered the stockholders at par, $10 a share. It was further stipulated that the new stock is to be first allotted to the present holders on a prorata basis. Any not taken will revert to the company, to be sold to the general public at $12.50 a share. This automatically fixes the price on the present outstanding stock.

Three years ago Kalamazoo Vegetable Parchment stock was freely offered at $11 to $12.50 a share. It has doubled in value in the brief period. Stock of the Glendale Pulp and Paper Company sold in January at par and has advanced steadily. The new plant began operations 60 days ago and with no indications of dividends payable for at least six months, the Glendale stock advanced to $15.62.

At the conclusion of the stockholders' meeting, Jacob Kindleberger, president of the company, officially announced that the funds received from the sale of the $1,150,000 stock issue would be used in the erection of a new two machine mill and that building operations will begin at the earliest date possible. The completion of this mill will give the Kalamazoo Vegetable Parchment Company two complete paper mills with four machines. A large parchmentizing and wax paper plant and a pulp mill, to convert wax paper to raw stock.

From the standoint of capitalization, the Kalamazoo Vegetable Parchment Company ranks fourth in the Kalamazoo River valley district. It is exceeded only by the Eddy Paper Company, Three Rivers and White Pigeon, with $7,000,000 common and $3,000,000 preferred; the Bryant Paper Company, Kalamazoo, $5,000,000 common and $300,000 preferred and the Kalamazoo Paper Company, $3,210,000 common.

It is planned to have all details of the consolidation and recapitalization completed before the end of the ensuing year.



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BIRD ROTARY SCREENS

UNITED CAMPAIGN BEHIND NATIONAL FOREST POLICY

American Forestry Association Announces Outline of Features to Be Embodied in Proposed Legislation—Col. Greeley Has Expressed His Approval of the Proposed Legislation, so That Practically Every Interest Concerned Is United and in Accord on the Bill—President-Elect Warren G. Harding Emphasizes the Importance of a National Forest Policy.

[FROM OUR REGULAR CORRESPONDENT.]

WASHINGTON, D. C., November 17, 1920.—For the first time in history a united campaign will be behind a national forest policy, a bill for which will be introduced in the coming session of Congress. Following a conference of the industries interest, the American Forestry Association has announced the outline of the features to be embodied in the proposed legislation.

Those Present at Conference

At this conference were: Elbert H. Baker of the Cleveland *Plain Dealer*, and S. P. Weston, representing the American Newspaper Publishers Association; Charles Lathrop Pack, president, and P. S. Ridsdale, the secretary of the American Forestry Association; George W. Sisson, Jr., D. A. Crocker, W. E. Haskell, R. S. Kellogg and C. H. Worcester, representing the American Paper and Pulp Association; Col. William B. Greeley, the chief U. S. Forester; E. W. McCullough of the Chamber of Commerce of the United States; George S. Long, National Lumber Manufacturers Association; E. T. Allen, Western Forestry and Conservation Association; E. F. Perry, National Wholesale Lumber Dealers' Association; John Foley, Association of Wood Using Industries.

Col. Greeley Approves Proposed Legislation

Col. Greeley has expressed his approval of the proposed legislation, so practically every interest concerned is united and in accord on the bill.

"Provisions are two-fold," says Mr. Pack. "They include a considerable extension of direct federal activity in forest ownership and production, and the development with federal aid and encouragement of such systematic policies in the several forested states as, being consistent with local conditions, will bring about adequate forest protection and reproduction in the interest of these states and of the public at large.

"With these aims, the programme provides specificially, through co-operation between the Government, the states and owners of timberlands, for adequate protection against fires, for reforestation of denuded lands, for obtaining essential information in regard to timber and timberlands, for extension of the National Forests, and for other steps all essential to continuous forest production on lands chiefly suitable for this purpose."

The Legislation Proposed

Much of the responsibility thus outlined lies with states and with private owners. To define that which lies with the government and hence is properly for the consideration of Congress, the following legislation is proposed:

1. Authorizing the Secretary of Agriculture after consulting appropriate local agencies to approve an adequate policy for each state, covering the essentials of fire protection on timbered and restocking lands, reforestation of denuded lands, and, where and to the extent necessary, the cutting and removing of timber crops so as to promote continuous production of timber on lands chiefly suitable therefor, and authorizing his co-operation in the work required, provided there is also satisfactory local compliance in state legislation or administrative practice. Chief although not entire emphasis for the time being on fire prevention, as the most important single step, and not less than a million dollars annually available for such co-operation with states.

2. A survey to obtain necessary information as to forest resources, forest production and forest requirements of the nation.

3. Provision for studies and experiments in forest reproduction methods, wood utilization, timber tests, wood preservation, development of by-products and other steps to bring about the most effective use of the nation's forest resources.

4. Provision for a study of forest taxation, to assist states in devising tax laws which will encourage the conservation and growing of timber. Also of methods of insuring against forest losses by fire.

5. Provision for more rapid replanting of the vast areas of denuded lands within the National Forests.

6. Appropriation of ten million dollars a year for five years for the purchase of lands which should be added to the National Forest system, whether or not on the headwaters of navigable streams as such purchases are now limited.

7. Authorizing acquisition of similar lands by exchanges of land or timber when clearly in the public interest.

8. Authorizing the addition to National Forests of lands now in other forms of government ownership but found chiefly suitable for permanent forest production.

Mr. Harding's Views on Forest Policy

On the importance of a national forest policy Warren G. Harding, the president-elect, in a statement to the American Forestry Association, says:

"There is a notable halting in the construction of homes because of the almost prohibitive cost. Lumber plays its very conspicuous part therein. Much of this, of course, relates to the increased cost of production which dates from the changed conditions since our entrance into the World War, but there is a permanent inclination to advance in cost because of the very manifest diminution of supply.

"We cannot be blind to the fact that during the tremendous growth of the republic, during the past half century, we have been drawing on our natural timber supply without a thought of the future. The American Forestry Association has given us figures to show that three-fifths of the original timber of the country has been consumed. It is of little value to recall the waste with which we have cut our timber, except that we ought to have learned lessons which will enable us to avoid so much waste in the future.

"The one thing which the government may do is to adopt that policy which will assure to future generations the timber which is necessary to our lumber needs. In our section of the country the supply is almost entirely exhausted. The dimunition in the softwood forests of New England, and lake states, and even the South, has been steady and continuous. Many watchful students of the situation think that another decade is going to put the South in a condition where it can do no more than meet its own demands. There remains a large supply on the Pacific Coast, but the problem of transportation makes this supply unavailable to the East and Middle West, unless we contemplate a cost of transportation which will continue to discourage building enterprise.

"There is ample land in this country of ours, not adapted to other uses, to produce a sufficient supply of timber for all our needs, if it is only stocked with trees and nature is allowed to contribute toward our necessities. We must begin to think of timber crops as we do other cultivation in this land of ours, and we must put an end to the carelessness and neglect to which we trace our destructive forest fires. With timber growing on the one hand, and forest preservation and protection on the other

(*Continued on page* 166)

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CONDITIONS ARE IMPROVED IN PHILADELPHIA MARKET

Both the Fine and Coarse Paper Divisions Report Improvement and Attribute the Betterment to the Belated Buying for the Holiday Season Which Is Just Setting In—Price Cutting in Boards Is Reported to Have Been Discontinued—Board Mills Were Hopeful That Lower Prices Would Stimulate Buying on the Part of the Box Makers, but This Did Not Occur.

[FROM OUR REGULAR CORRESPONDENT.]

PHILADELPHIA, November 16, 1920.—Both the fine and the coarse paper divisions of the trade were able to report for the past week, improved conditions as contrasted with the preceding and both attribute the betterment to the same cause—setting in of seasonable cold weather and consequent spur to the very much belated holiday season buying this year.

Holding Back for Better Terms

Consumers of both grades have been holding back for the twofold reason that their requirements were not large and that they hoped by waiting to get better sales terms. They were able to do this because holiday trade had not set in. The week, however, brought the very satisfactory change. No recessions in prices were reported by the jobbing houses, the heads of all of which report that though goods are a little easier to get, the mills are still generally oversold and that they are not shading prices to get business. Some cutting in commons is reported but the extent of this is not at all large and has no bearing on market conditions. The trade is now of the opinion that business will continue to show slight improvement until the close of the year and that no further general fall of prices in commodities generally will take place until holiday goods have been disposed of. After that retailers are expected to bring down prices as manufacturers and wholesalers have done. Paper prices, however, it is believed, will remain firm at present levels.

Price Cutting on Boards Ceases

The price slashing warfare among manufacturers of new, ship and combination board seems to have let up and ruling rates during the week were reported as between $55 and $65. The board mills had been hopeful that lower prices might stimulate buying by the box manufacturers, but their business is so poor that even goods at cost or less was not strong enough inducement to have them come into the market. Out of town demand at better prices than are being paid locally prevented a congestion of the mixed, commons and old news which a week ago went begging at $20 a ton. Book paper is still a drug on the market and the dealers are continuing to store it.

Demand from Glass Factories for Old News

Despite the fact that box mills are only offering $1 or so for old news collectors in New Jersey are paying housekeepers that amount for their old newspapers. It develops that the many glass factories in New Jersey are looking towards increased production and that they are in the market for old newspapers for packing purposes and are paying more than the board mills. Soft and hard white shavings are moving slowly but at least regularly and there is no accumulation.

100 Tons of Old Newspapers Burned

The 100 tons of old newspapers in the No. 4 stockhouse at the plant of the Philadelphia Paper Manufacturing Company, Manayunk, suffered from fire or rather fires, last week. On Thursday afternoon flames were discovered on the landing platform and these communicated to the stock house before the Company's own firefighters got them under control. On Friday the fire again broke out, and though it burned for several hours finally was drenched out without serious menace to the mill property. The plant last week ran only two of its five machines.

Study Paper Production Processes

The D. L. Ward Company is so much gratified with the meeting held last week in the Manufacturers' Club to give consumers of Warren papers an opportunity of studying production processes that similar gatherings are to be held throughout the winter, probably every other month. The poll of admission cards showed that there were exactly 1,066 in attendance, with a fair percentage of out-of-town visitors. In view of the fact that neither food nor smokes were offered to attract, and that many were compelled to pay railroad fare and hotel bills, the pulling power of the meeting was emphasized. The Ward Company has just taken the Philadelphia agency for the Peninsula Paper Company line of patrician covers, which will be carried in six attractive new colors and in light and heavy weights.

General News of the Trade

William H. George, at one time the largest of the direct mill representatives, with a suite of offices at 10th and Chestnut streets, during the week joined the sales force of the Whiting-Patterson Company. He will specialize on fine papers. Mr. George has been actively associated with the paper business for more than a score of years and has probably the largest acquaintance of any paper salesman in the city.

President Allen E. Whiting, of the Whiting-Patterson Company, was called to Holyoke on Saturday of last week, his father being critically ill in that paper making town.

Francis Saxton and Edward Hahn are recent additions to the sales force of the Charles Beck Company.

Samuel Katzok was appointed during the week by Judge Dickinson in the U. S. District Court here as receiver of the Lehart Paper Stock Company, Inc. The business has been closed. Tender of the Penn Paper and Stock Company to take over the lease of the building, Delaware avenue and Vine street, is pending.

Vice-president Considine, of the Paper House of Pennsylvania, was one of the enthusiastic Poor Richard Club members who journeyed to New York last week, carrying with them their own entertainment for the benefit of the Sphinx Club.

Efforts made by C. H. Peoples on behalf of others to organize a paper trade bowling league has been unsuccessful, but four firms agreed to raise teams and this was not regarded as a large enough number to constitute a paper house league.

The Philadelphia Paper Stock Dealers dined tonight in the home of President Evan G. Badger, 1234 South Broad street. The attraction was an old fashioned sauerkraut dinner. The meeting was the best attended in the past year.

Now Sheldon Transfer & Storage Co.

[FROM OUR REGULAR CORRESPONDENT.]

HOLYOKE, Mass., November 8, 1920.—Jesse E. Sheldon, proprietor of the largest mill transfer company in this city, has incorporated under the name of the Sheldon Transfer and Storage Company and the property held by him and others has been turned over to the new corporation. The largest piece of property is the old Beebe & Webber mill which Mr. Sheldon has owned for some time. The value of the property turned over to the new corporation is about $100,000. The Sheldon Company makes up full cars for western and other points by transferring small shipments from the paper mills and paper converters to one car, to one destination as far as possible, thereby securing a lower freight rate.

NORTHWEST

Steered—Driven—Operated from the Rotating Base by One Man

With a

Wood Grapple

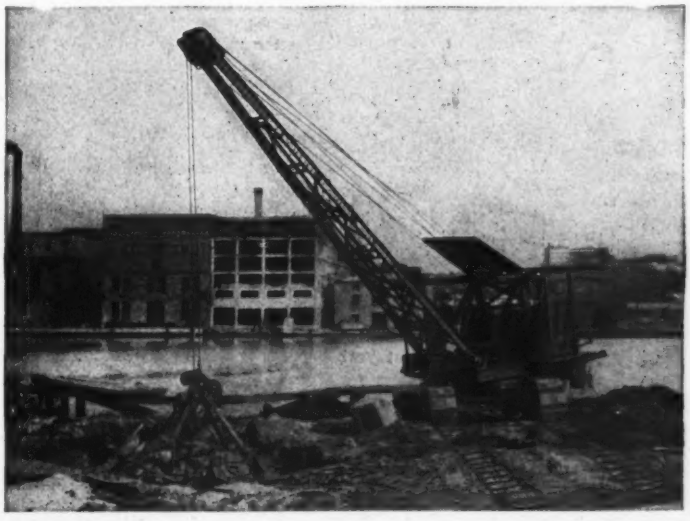
or

Clam Shell Bucket

On a NORTHWEST Crawler Type Crane, there are so many places that you can use it to advantage that it is impossible to even itemize them in one advertisement.

It—

Goes Anywhere Any Time—



Reasons Why

1. **Steers from the operator's platform by movement of one lever.**
2. **Travels under its own power on two crawler type wheels, same as war tanks.**
3. **Operates clam shell, dragline bucket, pile driver hammer, or electric lift magnet.**
4. **Equipped with 4 cyl., 60 H. P., Gasoline Engine.**

Write for specifications and prices.

DOES NOT REQUIRE RAILROAD TRACK OR PLANK

Northwest Engineering Works

General Sales Offices

28 E. Jackson Blvd., Chicago, Ill.

Phone: Wabash 9326

Works: Green Bay, Wisconsin

USE IT WHERE YOU WANT IT WHEN YOU WANT IT

PAPER DEMAND IN TORONTO FOR IMMEDIATE USE ONLY

Deliveries Are Freer Than They Have Been in Some Time and Mills Are Catching Up With Orders—General Reduction of 10 Per Cent on All Lines of Board With an Even Greater Reduction Than This on Chip and Straw Boards —Rumors State That Some English and American Mills Are Anxious to Supply Canadian Business—A. P. Costigane Reports Much Interest in Safety Work.

[FROM OUR REGULAR CORRESPONDENT.]

TORONTO, Ont., November 14, 1920.—Purchasing in the paper line is on a more conservative basis at present than it has been for months and the wholesale dealers are not placing orders for anything that they do not require for immediate use. No changes are looked for in price until after the new year at any rate. Deliveries are much freer than they have been for some time and mills are catching up with orders. The printing trade is rather quiet and this has caused the jobbers to ease up in their buying.

During the past week there was a general reduction of ten per cent on all lines of board and, on chip and straw board, the drop was even greater than this. It has been felt all along by factories that prices for the raw material were too high in view of the general trend in other commodities, and the mills have made a concession for the present month. It is reported that box board quotations may go still lower before the close of 1920. Manufacturers are pretty well caught up and the consumers are not rushed with business as they were a few months ago.

In the book paper line things are easier and, while the mills some time ago refused point blank to make contracts with publishers, it is now rumored that they are willing to do so but the publishers are holding back, contending that last spring when they wanted to enter into such an arrangement, the producers came out flat footed and refused to entertain any such a proposition. Some publishers have been quietly stocking up during the past few weeks and are now able to adopt a rather independent stand, so it is reported.

It has been rumored that English and American mills are anxious to get a chance at supplying some Canadian business. Wholesalers are pressing the manufacturers of writing, linen, bond and ledger papers to adopt a fixed price and abolish the practice of stipulating that, whatever figure prevails at time of delivery, shall be paid by them. It is contended that fixed values would do more than anything else at this juncture to stabilize the trade. The dealers declare they intend following up the matter with the utmost energy. Manufacturers, on the other hand, say the situation with them does not show any signs of clearing. Some jobbers desire to cancel some of the numerous orders placed a long time ago which the mills are now starting to fill, but manufacturers decline to listen to the proposition. There is still a shortage of a few lines of fine papers. American jobbers are offering in Canada tag manila and tissue papers very cheap, evidently being overloaded. Bristol board is arriving in larger quantities than it has in a long while.

Pulpwood Resources of Northern Ontario

Speaking before the Rotary Club, Toronto, Robson Black, of Ottawa, secretary of the Canadian Forestry Association, said that, in all the years of Canada's history, the axe had not cleared more than one hundred thousand square miles as against one million square miles on which the fire fiend has had full play. He described how the spruce areas in the Eastern States and the Lake States had started an exodus of gigantic paper mills across the Canadian border. The newspaper publishing business of America required sufficient supplies for a daily output of forty million copies. One New York paper alone stripped fifteen acres of dense Canadian forest for each Sunday edition. Any one of the large Toronto papers would devour, at least, two hundred, average size trees in a single day's run. The newspaper publishing business had no intention of quitting its job as long as any part of the world could feed it every twelvemonth with a pile of four foot long pulp logs piled four feet high and extending in length for 9,500 square miles. The vast areas to the north of Ontario's main belt of agricultural soil constitute a natural spruce farm capable, under proper management, of retaining Canada's present pulp and paper and lumber industries for all time to come and drawing scores of additional industries with a great volume of new population.

New Industries for the Twin Cities

Good progress is being made on the construction of the new pulp mill at Fort William, of the Fort William Paper Company. Some three hundred men are engaged on the job and the concrete work is now well under way. It is expected that the mill will be in operation in June next. Thousands of cords of pulpwood have been contracted for by the company which is buying up all the wood in the district that it can get hold of.

The Port Arthur Shipbuilding Company of Port Arthur, has just closed a most successful year. James Whalen, of the Whalen Pulp and Paper Mills, Vancouver, who is president of the Shipbuilding Company, states that the manufacture of pulp and paper machinery as well as digesters is contemplated by the organization in the near future.

Province Enters Suit for Big Sum

The Attorney General of Ontario will take civil action against the Shevlin-Clarke Lumber Company of Fort Frances, Ontario, for the recovery of the value of the timber found by the Crown Lands Investigation Commission to have been appropriated by them and not paid for. The interim report, just presented, says that from 1911 to 1919 the amount made in returns to the government and purchased logs by this company was 294,181,714 feet but the actual amount produced by the mills was 649,946,017 or a difference of 355,764,303 feet which was not reported. It is rumored that the amount which the government will sue for is three million dollars.

Splendid Advance in Safety Work

A. P. Costigane, of Toronto, secretary of the Ontario Pulp and Paper Makers Safety Association, visited the mills of the Toronto Paper Manufacturing Company at Cornwall and the Provincial Paper Company at Mille Roches, Ont., last week and reports that much interest is taken in safety work. Under the direction of Mr. Costigane the association is getting up a safety calendar suitably illustrated with sketches bringing home the lessons of neglect and carelessness in a pointed, pictorial way. The first calendar of this kind was issued last year by Mr. Costigane and the idea took so well that large orders were placed by the mills. So far orders for many thousands have come to hand for a similar work for the coming year.

Annual Dinner of Abitibi Forces

The annual plant talk and dinner of the Abitibi Fower and Paper Company was held recently at Iroquois Falls, Ont. The matters discussed were in relation to the operation of the plant dealing with the manufacture of pulp and paper alone, without going into the mechanical or other problems relating to them. George Carruthers of the Interlake Tissue Mills Co., Toronto, was one of the speakers at the annual dinner.

General Jottings and Personals

George Erskine, of the George H. Mead Company, Toronto, has

(Continued on page 164)

J. L. McEWAN
Vice President and
General Manager

ARTHUR McEWAN
President and Treasurer

R. W. McEWAN
Secretary and
Asst. Treasurer

McEWAN BROTHERS

MANUFACTURERS OF

NEWS AND FOLDING

Paper Box Board

Capacity 200 Tons Daily

Office and Mills at Whippany, N. J.

Eden Mills and Lining Plant

TELEPHONE CONNECTION

BOSTON PAPER MEN DO NOT FEAR FOREIGN COMPETITION

Raw Materials Are as High in Europe as They Are Here, and Although Labor May Be a Little Cheaper, This Difference Is More Than Offset by the Additional Cost of Transportation to This Country—Col. Fred W. Galbraith, National Commander of the American Legion, Is Entertained by a Number of Boston Paper Men—Boston Paper Trade Association to Meet November 17.

[FROM OUR REGULAR CORRESPONDENT.]

BOSTON, Mass., November 15, 1920—Paper manufacturers and jobbers are of the belief foreign competition cannot affect the local market or lower prices or production. Boston paper trade men say that foreign paper makers cannot compete with them, that raw materials are as high in Europe as they are here, and that although labor may be a little cheaper, this difference is more than offset by the additional cost of transportation to this country. They point to the need of some protective tariff which will hold off all foreign invaders of the market, at the same time declaring the general business does not warrant a drop in prices. Manufacturers here believe that the falling of the spot market during the past week or more is due more to a panicky state among themselves, which will subside now that a change of administration is assured.

Col. Galbraith Entertained

Colonel Fred W. Galbraith, national commander of the American Legion, and secretary of the Western Paper Goods Company of Cincinnati, was the guest of a number of Boston paper trade manufacturers and jobbers on Armistice Day, November 11, when he was decorated with the Victory Medal by Major-General David C. Shanks, commander of the First Army Corps area. Colonel Galbraith, a former Massachusetts man, was accompanied on his trip to Boston by Mrs. Galbraith, stopping at the Hotel Touraine. Colonel Galbraith was the principal speaker at the medal presentation exercises on Boston Common. He received an enthusiastic greeting from several thousand persons when he outlined the Legion policies to make America "100 per cent. American" and to obtain a square deal for disabled war veterans. Many of the Boston manufacturers and jobbers in the paper trade were in war service overseas.

The Colonel was tendered a banquet at the Army and Navy Club at 6 o'clock, the wounded men having another opportunity of meeting him. He was also a guest of honor at a dinner at the Boston City Club. He advocated the co-ordination of the war risk insurance bureau, the public health service and the federal vocational training board. Colonel Galbraith served overseas with the 147th infantry, an Ohio national guard unit, and was awarded the Distinguished Service Cross for bravery in action.

Boston Paper Trade to Meet

The Boston Paper Trade Association will hold its fall meeting at the Exchange Club, Batterymarch and Milk streets, Wednesday evening, November 17, at 7 o'clock. The meeting promises to be one of exceptional interest.

The speakers will be Charles G. Washburn, former Congressman, now of Worcester, Mass., and William J. Boardman, vice-president of the George Batten Company.

Mr. Washburn, the author of a biography of Theodore Roosevelt, will speak on "The Effect of Legislation Upon Business." Mr. Boardman's address will be on the subject of "The Effect of National Advertising on the Consumption of all Grades of Paper." Mr. Boardman is particularly well fitted to discuss this very important subject, as his firm has handled a tremendous amount of national advertising for the paper industry. Herbert W. Smith, former Navy song leader, will lead the singing. More than 100 have already signified their intention of attending this meeting. The guest charge will be $5.

H. W. Mason, president of the Boston Paper Trade Association, will preside. Other members of the committee in charge are J. A. Andrew, A. Leeds, T. H. Casey and W. B. Stevenson.

The following applications for membership will be acted on: D. K. Brown, of the Strathmore Paper Company, proposed by F. B. Cummings, and W. R. Elliott, of the W. R. Elliott Company, proposed by John E. A. Hussey.

Paper Firms at Graphic Arts Exhibition

Many Boston and New England paper manufacturers and jobbers have exhibits at the New England graphic arts exhibition being held in the Rogers building, 491 Boylston street, Boston, Mass.

A. Storrs & Bement Company, 140 Federal street, is making a special feature of its new announcement department, showing a fine line of writings and envelopes to match, in commercial and social sizes.

The Paper House of New England shows the development of advertising in announcements, broadsides and folders.

The George W. Wheelwright Paper Company has an interesting display of board "Dove Mill Bristols," including monotone process color work and lithographic printing upon this paper.

Stone & Andrew, Inc., 280 Devonshire street, are making a display of Hancock and other coated papers, including specimen books of dull coated papers and finished work.

The largest jobbers' exhibit is that of the Arnold-Roberts Company, 180-188 Congress street, which shows groupings of periodicals, catalogues, hangers, cards and stationery on different lines of papers. The exhibition is set off by a collection of books printed on various Arco papers.

Knight, Allen & Clark, celebrating their first anniversary, devote their exhibit to a showing of "Doeskin Cover Papers."

The 1920 Service Library of books offered by the S. D. Warren Company shows top sheets accompanying different lines of papers and dealers' driver pieces, a complete showing of manufacturers' direct advertising for an entire year.

Other exhibits of paper include special books by the Strathmore Paper Company, of Mittineague, Mass., with exceptional design and descriptive copy for which their advertising is distinguished.

General News of the Trade

Among recent visitors in the Boston paper market were Mr. Hopkins, sales manager of the Oxford Paper Company, Rumford, Me., and Mr. Keefer, of the Eaton Dikeman Company, Lee, Mass.

An unusually complete price list of paper, cardboard, envelopes, folders, weddings and announcements has just been issued by John Carter & Co., Inc., 100 Federal street, Boston. The list is the first issued since last Spring.

A delegate to the recent district convention of the Kiwanis Clubs in Holyoke, Mass., was Charles A. Esty, of the Charles A. Esty Paper Company, of Worcester, Mass.

The announcement department of the A. Storrs & Bement Company, 140 Federal street, Boston, under management of F. A. Laubscher, has been accumulating stock since its inception, the first of the year, and now has on hand a full and complete line of commercial and social bristols and flat papers.

Mr. Brown, of the Strathmore Paper Company, of Mittineague, Mass., was a recent visitor to the Boston market. The company's private printing plant has been moved into the addition recently completed.

The Worthy Paper Company, of Mittineague, Mass., has added gray to its line of colors in which manuscript covers are made.

Marathon Paper Mills Company

SPECIAL PAPERS for REMANUFACTURE

Super Calendered
Machine Finish
Machine Glazed Papers

Sulphite Bonds

Carton and Paper
Can Stock

MILLS and GENERAL OFFICE ∴ ∴ ∴ ROTHSCHILD, WIS.

SALES OFFICE ∴ ∴ 1126 CONWAY BLDG., CHICAGO, ILL.

SWEDISH EXPERTS DISCUSS PAPER MAKING

Swedish paper making experts are having a rather animated debate on certain phases of their professionel work. As in many similar cases the experts fail to agree. Sigurd Smith, a chief engineer, compares the knives of the grinder to the blades of a pair of scissors and maintains that fibers are cut without coming into actual contact with the knives, the same as grass is cut by a lawn mower, although there is comparatively wide space between its cutting knives. Smith also discusses fibrillation and the influence of the water's temperature upon the result of grinding.

Takes Issue with Smith

Prof. G. Sellergreen, in the Swedish *Paper Gazette*, in an article widely discussed in trade circles, takes issue with Sigurd Smith. As the latter is basing his conclusions, in part, upon American and English expert opinion, quoting Clayton Beadle and contributors to American trade journals profusely, Prof. Sellergreen's contentions might be of interest to American readers.

Sellergreen differs with Smith as to the nature of the process within the grinder. There is no "cutting" in the grinder, he says, neither by knives nor by scissors, but solely a tearing up. He denies there is any similarity between the action of a grinder and that of a pair of scissors. In the action of scissors the cutting is done by two blades approaching one another, while in the

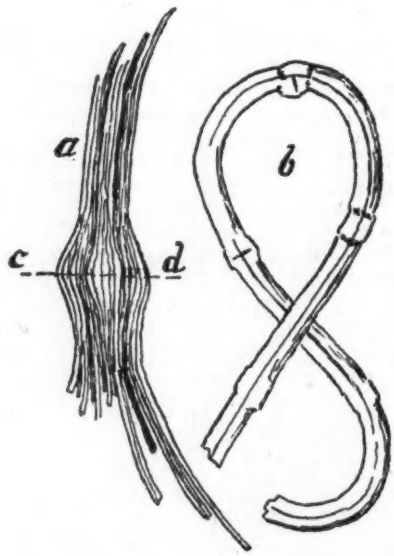


FIG. 1.

grinder the knives of the cylinder and those of the base pass one another at the same distance continuously, without any varying of the distance. Prof. Sellergreen also dismisses comparison with a grass mower. The latter, according to the professor, pinches off the grass, or most of it, instead of cutting it. However, whether cutting or pinching, the actual process is of little importance to the profession, says the professor. The condition of the stock produced alone is decisive. Prof. Sellergreen thinks pressure is the controlling factor. Increased pressure will either produce clear cutting or complete crushing of the fiber. He concedes the temperature of the water to be another possible factor.

The professor put fibers of thin, diluted matter, to be distinguished from "doughy" or "smeary" stuff, under the microscope and found they consisted of a number of lengthier fibers, promising good feltering possibilities, and a lot of short broken off ends of fibers, one of which is shown in cut 1, marked a. These fiber ends are as short as 0.15 mm. and most of them show a flattening out or widening of the fiber near the end (marked c-d), while the end itself looks frazzled, showing a number of fibrils of unequal length. Prof. Sellergreen thinks that in this case the pressure placed upon the matter was too strong. Too much pressure, according to Sellergreen, weakens the fibers, by the flattening out and by fibrillation. The unequal length of the

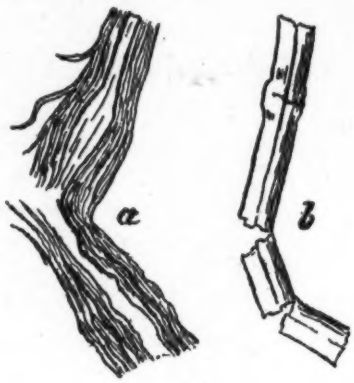


FIG. 2.

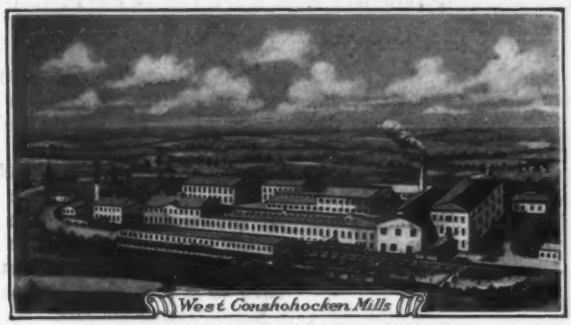
fibrils he explains as evidence of the unequal power of resistance inherent in individual fibrils.

Finds No Practical Value in Formula

Prof. Sellergreen finds no practical value in Clayton Beadle's formula, quoted by Sigurd Smith, enabling one to determine the length of fibers at any given time during the grinding process, so much more as this determination is possible only whenever the formula is applied to the same stock, as Smith concedes. Therefore, fibers of different origin could not possibly be compared with one another. Prof. Sellergreen, in textile-technical experiments, found, when endeavoring to determine the length of fibers, that linen cells had a unit weight of about 1.5 grams per metre at a grade of solidity amounting to 40 kg. per square millimeter. If you, according to the formula quoted, says the professor, assume a quantity of 3,000 kg. filling the grinder, take 0.8 centimeter as an average length of fibers at the beginning of grinding, figure the fibers weight at 0.000015 per centimeter and suppose that, on the average, the fibers will be shortened to one-quarter of their original length, then you will find that 500 million cuts were necessary to bring this about. This figure might be interesting theoretically, says Prof. Sellergreen, but it is of no practical value, for, actually, some of the fibers will be cut so many more times, while the rest will be cut so many less times. The length of the fiber, according to Prof. Sellergreen, is determined by its own power of resistance. The power of the individual fiber to withstand efforts to tear it asunder is the only determining factor. If there were a cutting process in the grinder, similar to an incision between the blades of scissors, power of resistance on the part of fibers would be totally ineffective.

By microscopic study of fibers including those of vegetable and animal origin, Prof. Sellergreen found a wide difference, essentially structural, between younger and older cells or capillæ. In the case of a younger cell, shown in cut 1, marked b, the lumen is almost invisible, and the individual fibrils are closely joined in an absolutely firm solidity. When the cell becomes older the lumen will increase, the walls of the cell become thinner, and dark lines

(*Continued on page* 136)



Where Our Protective Papers Are Made

DIAMOND-F PROTECTIVE PAPERS

GLASSINE, GREASEPROOF, PARCHMOID, FILTER PAPER, VEGETABLE PARCHMENT

Diamond-F Protective Papers are pure cellulose, and are free from oils, chemicals, waxes, metals, and other foreign matter. They are made from the best raw materials obtainable and are carefully inspected, purified and prepared. Every operation is conducted in our own plants which insures the highest quality in all our papers.

Diamond-F Papers have a tough, dense structure, which permits folding or creasing without cracking. They can be printed and pasted. Diamond-F Protective Papers are furnished in rolls, sheets and circles. See your jobber or write us direct for samples and prices.

In Canada:
Diamond State Fibre Co. of Canada, Ltd.
Toronto
Offices in Principal Cities

Diamond State Fibre Company
Bridgeport, Pa. (near Philadelphia)

Oswego Falls Pulp and Paper Company

FULTON, NEW YORK

Newsprint Paper	Test Container Board
Ice Cream Board	Chip and Folding Box Board
Oyster Pail Board	Fruit Wrappers
Bottle Cap Board	Mill Wrappers
Match Board	Bleached Sulphite
Wood Pulp Board	Unbleached Sulphite

SALES AGENTS FOR

SKANEATELES PAPER COMPANY, SKANEATELES, N. Y.
Hinckley Fibre Company, Hinckley, N. Y.

SWEDISH EXPERTS DISCUSS PAPER MAKING

(*Continued from page* 134)

appear, running lengthwise. The fibers become more loosely joined and air enters the space between them, forming thin capillary channels. Solidity and firmness decrease in proportion.

Result of this investigation is in line with experience in the realm of wool and silk. Lengthwise stripes in wool fibers signify that the wool was taken from old animals. Thus it may be assumed that fiber b might pass through between the cylinder and base in a grinder many times without being cut or altered in any manner at all, while fiber a would not withstand any such treatment with the same resistibility.

Resistance in Fiber of Different Age

Prof. Sellergreen put under the microscope fibers contained in ancient linen found in burial grounds at a recent excavation. The dead, clothed in this linen, were buried about 700 or 800 years ago. The bodies had totally disappeared while the linen was still present, although in a very delicate and brittle form. When touched with a needle parts of it would almost disappear, leaving nothing but a slight trace of almost invisible powder. Here, too, Prof. Sellergreen found wide divergence in the power of resistance between fibers of different age. While the "young" cell, as shown in cut 2, marked b, discloses rather clean cuts at the breaking points, the "older" fibrillated cell makes a rather frazzled appearance under the microscope, showing a mangled point of breaking.

Professor Sellergreen does not agree with Sigurd Smith when the latter calls the hygroscopicity of fibers and their swelling a valuable quality in forming "smeary" matter. Clayton Beadle's opinion of the value of the rapidity in which fibers became saturated with water, is dismissed as immaterial. For, according to the professor, an old fiber, largely fibrillated, is more hygroscopic than a younger fiber and will, undoubtedly, become saturated more quickly with water than the younger cell. The older fiber, filled with water, would be, perhaps, the smoother and more flexible one, but it would not be the better fiber, according to Sellergreen. At the same time he thinks the question whether fibers whose capillary channels are filled with water are more flexible than those whose channels are filled with air, a "horse of another color." Sellergreen also disagrees with Smith as to the availability of figures showing the hygroscopicity of cellulose under varying conditions, and quotes appertaining figures, partly of older date, by von Hoehnel, and partly those fixed by himself, as a result of his work, as well as such gained at the laboratory of the Swedish Peat Culture Association.

The following table tells the hygroscopic tale:

Hygroscopic Table

Origin and condition of fiber	Increase of air dry weight within 24 hours in air saturated with steam, expressed in percentages	Percentages when submerged in water 24 hours	Percentages in swelling of the original diameter of the fiber
Linen, unbleached	4.45	540	24.4
Linen, bleached	....	160	....
Jute	6.46	390	....
Cotton, unbleached	7.92	300	27.5
Cotton, bleached	....	1,100	....
Peat fiber, raw.....	9.36	790	....
Wool	8.20	260	13.7
Tussah silk	....	....	11.0

Prof. Sellergreen thinks the divergence in the results shows no comparison is possible that would be of any value, although the different conditions prevailing at the time measurements were taken may account for some of the variations. He points to the difference in the hygroscopicity in the case of bleached and unbleached linen where, he says, no doubt the epidermis or cuticle of the unbleached variety resisted the influx of water. In all these experiments water was of the ordinary atmospheric temperature. According to Wolf the capillary power, strangely enough, is diminished by the higher temperature of fluids, says the professor. Accordingly a higher degree in the temperature of the water would decrease the swelling of fibers. However, when the fiber is again submerged in cold water it will again swell, as is shown, for instance, when it enters upon the sieve of a paper making machine.

Preventing Loss of Organic Substance

Dissolving vegetable raw material by alkaline processes heretofore known, says Dr. Carl Siegfried Fuchs, of Heppenheim, has meant a loss of organic substance amounting to 35 or 40 per cent. Dr. Fuchs has invented a process which, he claims, avoids such loss. The invention is patented. According to his invention, the dissolving process is divided into two parts.

During the first part the vegetable matter is treated as delicately as possible. The object is to produce a stock of purely brownish-yellow color, having an agreeable odor. Acetic treatment will produce large quantities of lignin acid, forming a jelly. The stock seems to become almost rigid. After this degree has been reached the cooker is cooled. When the stock is cold, mineral acids or a solution of bisulphite is added. When brought to a boil again the lignin acids will separate in a form permitting filtration. They may be used as powder, as substitute for rosin, etc. After the waste liquor is withdrawn more alkali, in moderate quantities, is added and the process of cellulose making is finished at a higher temperature, unless one is satisfied with the degree of segregation already accomplished.

Where straw is used as raw material, for instance, during the first phase of the invented process, Dr. Fuchs uses from 4 to 6 kilograms of soda hydrate to 100 kilograms of straw. He cooks it 6 hours at 100 degrees C., or 4 hours under light pressure (up to 3 atmospheres). Then the cooking is finished after 2 kilograms of caustic soda have been added for every 100 kilograms of straw. The soda has to be dissolved in a corresponding amount of water before it is added. During the first phase from 300 to 400 litres of water are used to every 100 kilograms of straw. In this manner from 10 to 11 per cent. of the weight of the straw is obtained in the form of lignin acid.

B. E. Hutchinson Honored at Holyoke

HOLYOKE, Mass., November 15, 1920.—B. E. Hutchinson, treasurer of the American Writing Paper Company, was the past week elected president of the Holyoke Chamber of Commerce, succeeding Philip M. Judd, of the Judd Paper Company, who declined further service. Mr. Judd found his time taken up more than he could spare and would not consent for further service. He was a member of the committee who were successful in securing the services of Mr. Hutchinson. Mr. Hutchinson, although only a short time a resident of Holyoke, has made himself well liked and has served on various "drives" with credit and satisfaction.

Dr. H. M. Mosdall, formerly of Toronto, and now editor of the St. John, Newfoundland, *Star*, who was in Toronto recently, states that negotiations are going on by Lord Rothermere and other English capitalists with a view to forming a company which will be capitalized at a million and a half dollars to take over pulpwood and timber limits on the island and develop huge water power resources. Options have been secured.

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VALLEY IRON WORKS SHIPS ITS FIRST PAPER MACHINE

Is the First Machine of the Kind Ever Made in the Fox River Valley, and Outside of Beloit the First One Ever Made in Wisconsin—Is a Five-Cylinder Machine Made for the H. W. Johns-Manville Co. Plant at Manville, N. J.—Firm Has Started to Build a Similar Machine to Be Sent to the H. W. Johns-Manville Co. Plant at Waukegan, Ill.—Kimberly-Clark Accident Prevention Work.

[FROM OUR REGULAR CORRESPONDENT.]

APPLETON, Wis., November 16, 1920—The first paper machine ever made in the Fox river valley and the only one ever made in Wisconsin outside of Beloit, is being shipped this week from the Valley Iron Works plant here to the H. W. Johns-Manville company plant at Manville, N. J. The machine, which is of the five cylinder roofing paper type, is 225 feet long, will make a sheet 80 inches wide and weighs more than 400 tons. It requires 19 freight cars for transportation to the New Jersey city. It will have a capacity of fifty tons of paper daily.

Shipment of the machine marked the beginning of an epoch in machine construction in the Fox River Valley. The Valley Iron Works has recently completed a large addition to its plant to take care of its increased production. Work has been started on a similar machine, which is to be sent to the H. W. Johns-Manville company plant at Waukegan, Ill. The company intends to continue in the paper machine making field and has invested a large sum of money in extra machinery, patterns and equipment for that class of work.

Outside of the paper machine business the company is now devoting considerable attention to building the Niagara beater, which was described in the PAPER TRADE JOURNAL some months ago. This machine, said to be a vast improvement, is attracting widespread attention, papermill men coming from all parts of the country to see the apparatus in action.

Fifteen of the beaters have been completed and are now being installed. The company has many orders on its books, sufficient to keep the plant running for months.

Accident Prevention Work Big Success

The Kimberly-Clark company's accident prevention efforts during the year ended July 1, 1920, resulted in reducing the number of accidents by 49 per cent., as compared with the previous year, according to statistics made public late last week. Accidents last year numbered 127, with a loss of 1,846 working days, as compared with 252 accidents and the loss of 3,794 days the previous year. Only two accidents, both of a minor nature, occurred during no accident week, from Nov. 1 to 7.

The most marked improvement was made in the mill at Niagara, considered the most dangerous of all the company's mills, where the number of accidents was reduced from 116 in 1919 to 40 in 1920. An improvement of 65 per cent was noted in that mill. In the Kimberly mill the number of accidents was reduced from 107 in 1919 to 63 in 1920, an improvement of 41 per cent. All the other mills showed an improvement with the exception of the Neenah mill, where there were five more accidents this year than in 1919.

One of the most notable results of the company's safety campaign, the report says, is the care which workmen are taking against infection. First aid rooms are maintained in all the mills, to which the men are urged to go to receive treatment for minor cuts and bruises. In the Kimberly mill alone 615 men took advantage of this treatment, whereas, in years before the safety movement was given impetus, the number never exceeded 50.

At the annual safety first meeting, Ernest Mahler, general superintendent of the Kimberly-Clark company, said that competition in industry is increasing and that only mills which are operated with the greatest efficiency will remain in existence. He urged greater co-operation between the operating and the administrative departments of the company in order to increase or maintain efficiency, so that the Kimberly-Clark mills will be able to compete with other companies in the industry.

Marinette and Menominee Co. Improvements

With considerable ceremony the Marinette and Menominee Paper Company's new dam across the Menominee river, between Wisconsin and Michigan, was opened last week. This dam replaced an old structure which was inadequate. The new structure is built of concrete and reinforced with steel, is 25 feet high, 600 feet long, 22 feet wide through the base and six feet wide at the top. Construction work was started July 1. The spillway section is 350 feet long, and the remaining 250 feet consists of Taintor gates, 20 feet wide; a log sluiceway six feet wide and a fish way, six feet wide. The gates are operated by electricity. It is said the sluicing capacity of the dam is four times greater than the largest flood volume ever recorded in the river, thus obviating all flood dangers which have threatened the cities of Marinette and Menominee in the past. The company is contemplating the erection of another dam across the Menominee river, but has not decided when the work will be started.

Other improvements at the Marinette and Menominee company's plant during the year include installation of new boilers in the Park Mills; erection of a storehouse, 40 by 80 feet; enlargement of digester capacity and extensive repairs in the Park mill. The company is now putting up a new office building.

Power for Paper Mills on Wisconsin River

White coal of the Wisconsin river, now driving a half dozen or more paper mills, will be even more efficiently utilized when the Wisconsin Valley Electric company completes its huge dam across the river at Wausau. This structure, one of the largest in the state, will harness the turbulent waters to one of the largest power plants in this section, supplying electrical energy to more than a score of towns and cities and driving the machinery of several dozen mills and factories. Three or four papermills, including those at Mosinee and Rothschild, are more or less dependent on this company for their electrical energy, and it is evident that its development is reflected in the paper industry.

The dam, which will be 1,000 feet long and 26 feet high, will be completed early next summer. The company hopes to have its new power plant ready for operation at the same time.

Hard Luck

Aaron Pareira, president of the Victory Bag and Paper company, Marinette, claims the hard luck championship of the paper industry. His injuries this year may be tabulated as follows: Fell in the machine shop of his plant early in the year and fractured three ribs; his auto somersaulted after crashing into a hitching post and injured him slightly; fell on board his yacht and fractured two ribs; last week while in Chicago he was struck by an automobile driven by a boy and suffered a dislocated shoulder and bad body bruises; then took a taxi to the depot, but on the way the taxi was struck by a truck and he suffered some more cuts and scratches. "I am glad there are only 12 months in 1920 and that the year is nearly ended," Mr. Pareira said.

The Whitaker Paper Company, Cincinnati, has opened a western Michigan office in Kalamazoo. Walter A. Poos is in charge.

A 300 horsepower boiler is being installed in the boiler plant of the Superior division of the Bryant Paper Company. It has been necessary to entirely rebuild the boiler house to make room for this increase in equipment.

DECOLORIZATION OF SULPHITE LIQUORS

By Clarence Jay West, Information Department, Arthur D. Little, Inc.

One of the questions discussed at a recent meeting of the German Pulp and Paper Chemists and Engineers was the possibility of decolorizing waste sulphite liquors without destroying the valuable constituents. Many agents have been tried in an attempt to produce a light yellow product from the waste liquors or the extract prepared from these liquors. Mechanical agents, such as kaolin, chalk, zinc white, etc., have given a certain degree of success.

Decomposition of Constituents

Chemical treatment is usually accompanied by a decomposition of the valuable constituents; in this connection it must be remembered that the natural bleaching agent, sulphurous acid, is present in considerable quantities in the cooking liquor and has contributed to the decolorizing of the waste liquors.

The liquors darken to a degree corresponding to the removal of the free sulphurous acid from the liquor and to the decomposition, through evaporation, of the sulphonic acids with the liberation of further quantities of sulphurous acid: the darkening is probably actuated by the oxidizing effect of the oxygen of the air. The logical means to be used for decreasing the color is, therefore, sulphurous acid or salts and compounds which are capable of splitting off this acid.

Hydrosulphurous acid, one of the older chemicals used for this purpose, is still the best bleaching agent, especially if the acid can be brought into action in a nascent state.

The use of lead acetate and other special reagents has the disadvantage that it introduces foreign substances, which, for several purposes, are distinctly injurious. It is necessary, therefore, to consider in each case why the bleaching is carried out, and the use for which the waste liquor is intended.

Some Examples

According to Klason, for example, the lignosulphonic acid salts may be precipitated from the waste liquor or a blood red compound with L-naphthylamine sulphate. There remains in the slightly yellow liquid the sugars (dextrose, mannose, galactose and arabinose). The decolorizing process is, in this case, accompanied by the loss of important compounds of the waste liquor.

In another case one obtains a polishing agent for leather if the waste liquors are treated with ethyl chloride according to Krohl's method. The adhesive properties of the liquor, however, are destroyed by this treatment.

Several investigators have tried the action of blood, bone, and animal charcoals upon these waste liquors, but with no success. Stein is of the opinion that this failure is due to the fact that the color of the liquor is not due to the presence of small amounts of substances which can be removed by absorption, but that the colored substances form an important constituent of waste liquors.

One must, therefore, conclude that, up to the present time, the decolorization without a more or less pronounced change in the chemical composition of these liquors has not been accomplished.

Offer Free Trade Nostrum to France

Paris, October 15, 1920.—"Why should France try to maintain an industry, such as paper making, almost wholly dependent upon imported raw material? Why should Frenchmen tax themselves for the purpose of perpetuating an economic waste? Why erect a tariff wall and permit paper manufacturers to mulct the consumers? Why not let countries that produce the raw materials manufacture paper? Would it not be the sensible, the economically profitable thing? Would it not bring down the prices and would it not knock out the profiteers? Would not free trade restore fair and normal conditions?

These questions were presented to the French paper industry by a school of international theorists who think their free trade nostrum will cure all the evils of present and future times. At the beginning it might be stated that French paper manufacturers are as much against voluntarily giving up their ghost as United States paper manufacturers are disinclined to close their plants and leave the field to Canada.

French paper manufacturers are against removing the tariff on paper. In an official statement, issued by the Association (syndicate) of French Paper Manufacturers, they declare against any internationalization of business and reject the theories of universal free trade. At the same time the syndicate defends the industry against charges of profiteering.

The free traders argue there is no sense in keeping alive artificially an industry which, in the long run, is bound to succumb. The syndicate says almost any industry is kept alive artificially, more or less so. At any rate, there would be quite a number of French industries that would have to quit if they were not protected by a high tariff. French woolen, cotton and leather manufacturers, for instance, would have to walk the plank as well as paper producers should free trade theories gain the upper hand and international "rationing" of industries should take place.

The syndicate concedes that the French paper industry is compelled to import most of its stock from foreign countries. England, however, is doing the same, and no one ever suggested that English paper manufacturers should go out of business because Swedish or Finnish manufacturers could produce paper at less cost. The syndicate points out that France's position would be worse, compared with England's, because England rules the seas while France would be cut off from paper supplies entirely should another war break out and France happen to be opposed to England. France, depending upon foreign manufacturers, after having killed her own paper industry, would be left high and dry in such an emergency. England, supreme on the seas, does not think of abandoning its paper industry, and why should France, in a less fortunate position, commit such folly?

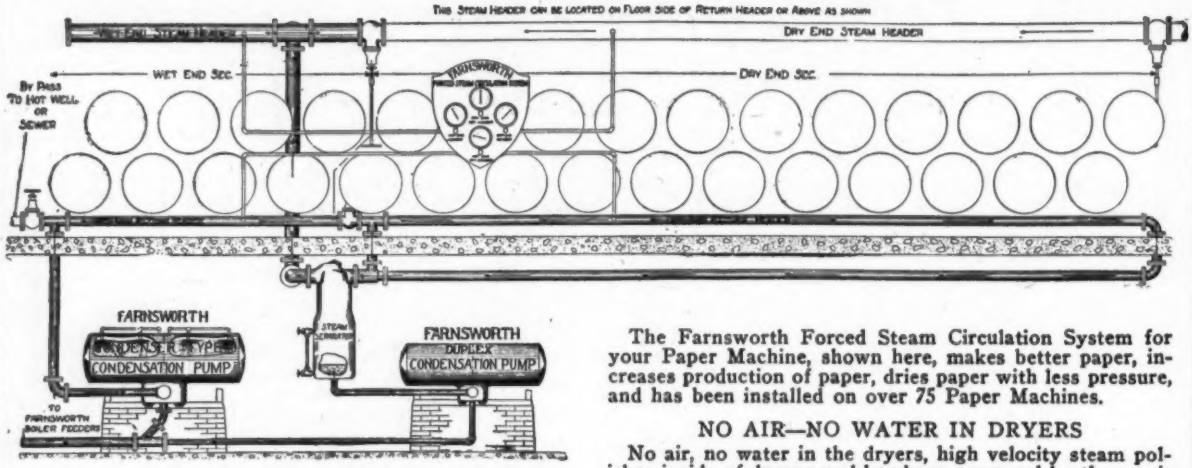
Since 1914 France is suffering from a shortage of shipping. This should be a lesson to economists, says the syndicate, and should impress every one with the necessity of producing as much of the nation's needs at home as possible. England does not even think of removing the duty on foreign paper. Although England has been a typical free trade country it protects her paper industry, the statement says. Were France to depend upon foreign manufactures French paper merchants would have to lay in vast stocks, in order to protect consumers in case of emergency. Large quantities of paper thus stored away, however, would mean a tremendous amount of dead capital lying idle. An economic waste, indeed!

French manufacturers resent the charge of usury. It had been claimed by the free traders that at the beginning of the war exorbitant prices had been asked for paper manufactured under peace-time conditions. The manufacturers say that at the outbreak of the war there was little paper at hand in the mills. If there was any profiteering it must have been done by wholesale and retail dealers who happened to have considerable stocks on hand and made the most of a favorable opportunity.

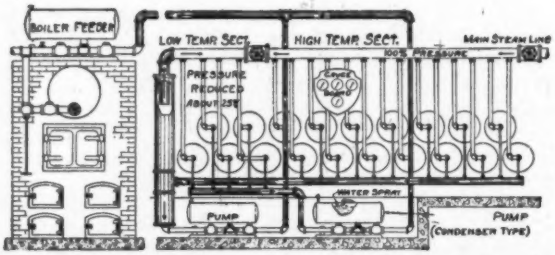
It is true, the statement says, that most of the paper manufacturing concerns have been paying high dividends of late. It is claimed, however, that those dividends were not any too high in view of the uncertainty of the times.

The ratepayers of Fort William recently carried a bylaw by a large majority in regard to the building of a car line and a roadway to the new plant of the Fort William Paper Company.

Farnsworth Systems For Paper Mills


THIS STEAM HEADER CAN BE LOCATED ON FLOOR SIDE OF RETURN HEADER OR ABOVE AS SHOWN
DRY END STEAM HEADER
WET END SEC.
DRY END SEC.
BY PASS TO HOT WELL OR SEWER
FARNSWORTH
CONDENSER TYPE CONDENSATION PUMP
STEAM CONDENSER
FARNSWORTH DUPLEX CONDENSATION PUMP
TO FARNSWORTH BOILER FEEDERS

No complications, no changes in the dryers—can be installed without interfering with production. Condensation coming from Paper Machine can be delivered to Feed Water Heater, or returned directly into the boilers under pressure and at the same temperature as it leaves the Paper Machine.



The Farnsworth Forced Steam Circulation System for the Tissue Machine is guaranteed to eliminate all water and air from the dryers. Paper makers know the advantage of such a system.

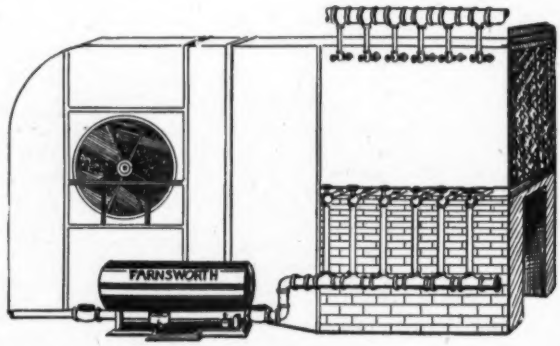
FARNSWORTH ENGINEERS MAKE LAYOUT

Farnsworth Engineers will inspect your conditions, make the layout and supervise the installation.

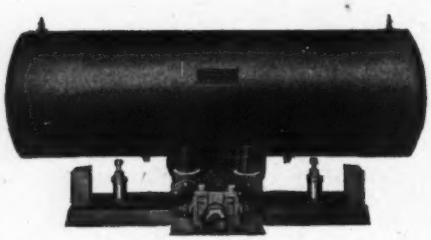
The Farnsworth Forced Steam Circulation System for your Paper Machine, shown here, makes better paper, increases production of paper, dries paper with less pressure, and has been installed on over 75 Paper Machines.

NO AIR—NO WATER IN DRYERS

No air, no water in the dryers, high velocity steam polishes inside of dryers, and has been approved by the president down to the boss machine tender.

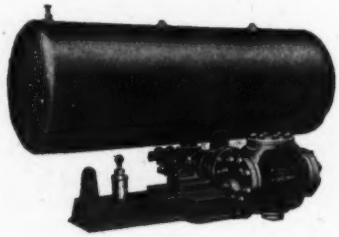


Use the Farnsworth System to drain your blast fan coils, heating systems and other heating apparatus into Farnsworth Machines, which return the condensation directly into the boilers and save coal.



Increase Production

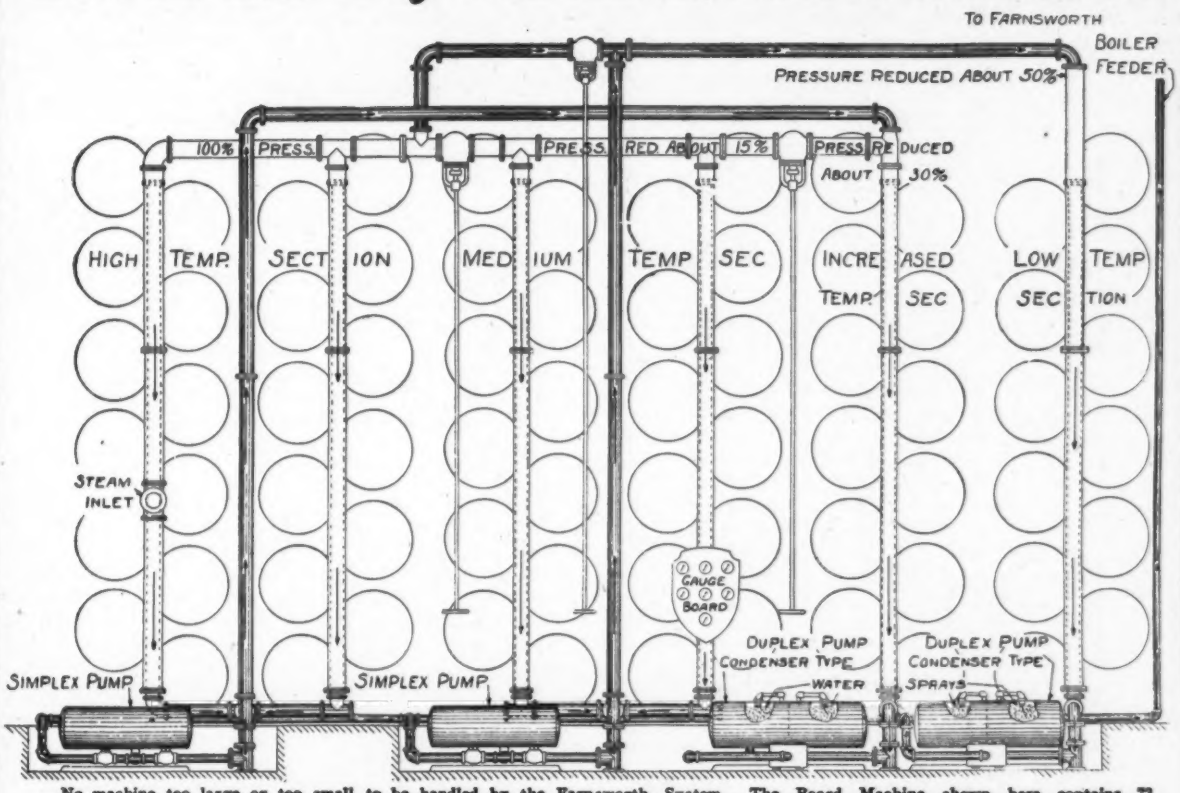
Save Fuel



Farnsworth Company - Conshohocken, Pa.

Canadian Farnsworth Company — **Toronto, Canada**

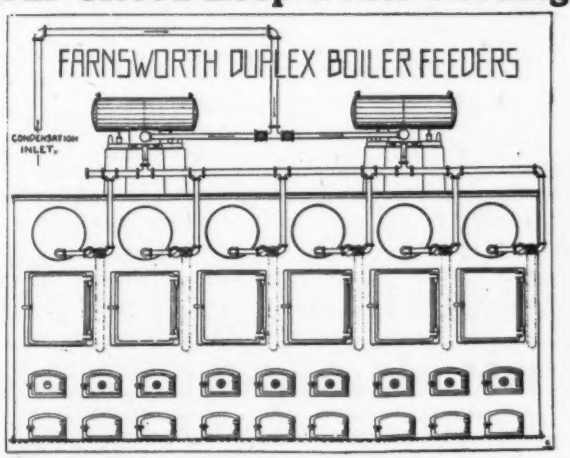
Save Fuel–Dry with Less Steam Pressure



No machine too large or too small to be handled by the Farnsworth System. The Board Machine shown here contains 72 dryers, temperature of which is just as hot as the steam will make them. With no water in the dryers the load on the engine is reduced.. System can be installed on Paper Machines with or without basement. Return line should be connected to Duplex Boiler Feeders, shown below, so that condensation is returned directly into the boiler. No charge made for preliminary report on your plant.

Farnsworth Closed Loop Boiler Feeding System

All condensation from paper machines, heating systems, fan coils, etc., returned directly into boilers at high temperature.



System saves 10 to 30% of coal. Pays for itself several times over each year. Operation is automatic.

Farnsworth Company, *Engineering Service* **Conshohocken, Pa.**
Canadian Farnsworth Company **Toronto, Canada**

SHOWER PIPE FOR PAPER MAKING MACHINE

A patent has been granted to Robert W. Stevens, of New Haven, Conn., on a shower pipe for paper making machines, which is interestingly described by the inventor as follows:

Figure 1. A front view of a portion of a paper-making machine illustrating the location of my attachment with relation thereto.

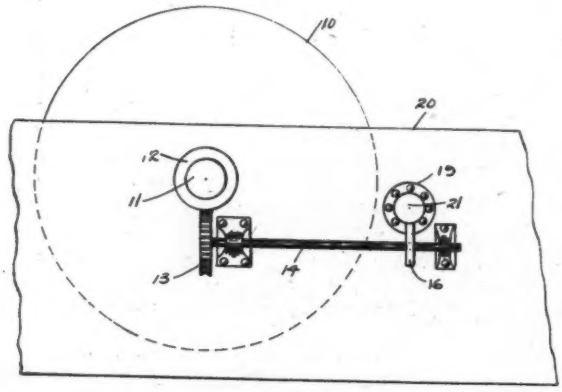
Fig. 2. A side view partly in section of my improved shower pipe.

Fig. 3. A longitudinal section view of the pipe and adjacent parts detached.

Fig. 4. A broken perspective view of a portion of the pipe showing one of the swabs therein.

This invention relates to improvement in shower pipes for paper-making machines. In paper making, a number of the rolls,

Fig. 1.



cylinder molds, felts, wire cloth, et cetera, must be kept clean and it is common to arrange a spray or shower in close relation thereto, but the pipes of such sprays or showers become clogged and it is difficult to keep them clear. Furthermore, as usually arranged, the spray pipes are stationary so that the water is distributed in rows. The object of this invention is to arrange a pipe in close relation to the roll or mold to be sprayed and provide for longitudinally moving the pipe and to arrange within the pipe a series of swabs which, as the pipe is moved, will clear the openings in the pipe so as to permit the water to be freely discharged, and the invention consists in the construction as hereinafter described and particularly recited in the claims.

In carrying out my invention I have shown my device arranged in connection with a cylinder mold 10, of an ordinary paper machine, to the shaft 11, on which I mount a worm gear 12, meshing with a worm wheel 13 on a shaft 14, which is suitably supported and which carries an eccentric or cam 15. This cam 15 stands between two cam arms 16 and 17, depending or projecting outward from a shower pipe 18, which is arranged parallel to the shaft 11 of the cylinder mold and projects outward through

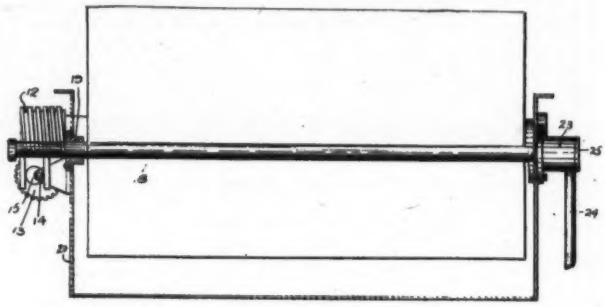
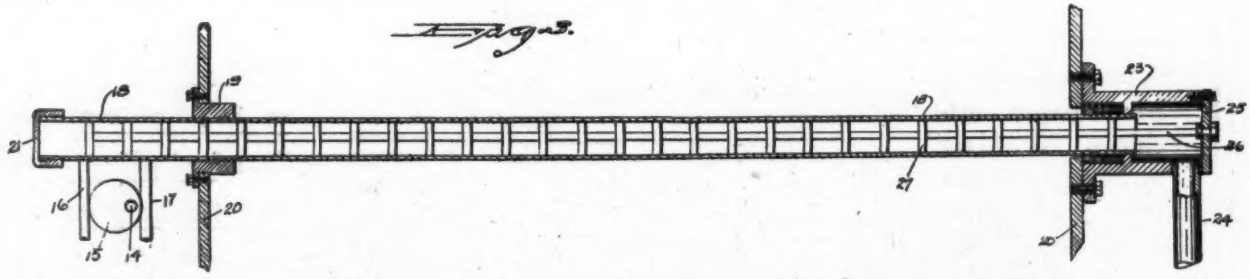


Fig. 2.

a bushing 19 in the frame 20 of the machine. The outer end of the pipe is closed by a cap 21 and the pipe is formed with a series of perforations 22 and its rear end is supported in a stuffing box 23 at the rear of the machine. Into the stuffing box a liquid supply pipe 24 enters so as to be discharged into the shower pipe 18. Supported by a plate 25 or otherwise, is a rod 26 which extends forward through the shower pipe 18 and mounted on this rod are a series of swabs 27 which closely fit in the shower pipe 18 and each swab is formed with a number of perforations 28 through which the liquid may pass. The liquid to be used in the shower is admitted under pressure through the pipe 24, entering the stuffing box 23 and, passing through the shower pipe 18, is distributed through the perforations 22 upon the mold, roll or other part of the machine, and as the machine is driven, the cam 15 moves the pipe 18 back and forth so that the openings 22 in the pipe pass the swabs and are cleared thereby. I thus provide simple and convenient means for keeping the shower pipes for paper-making machines free to discharge their functions and the spray is evenly distributed throughout the length of the roll or mat.

Fig. 3.



What Is Claimed

1. In a shower pipe for paper-making machines, mounted for a longitudinal movement and formed with a series of perforations combined with a stationary rod having a series of swabs mounted thereon and over which the shower pipe rides.

2. In a paper-making machine, a combination with a shower pipe, means for longitudinally moving the pipe, a stuffing box supporting the open end of the pipe, a fixed rod supported in line with and entering said pipe and a series of swabs mounted on said rod.

PRACTICAL QUESTIONS AND ANSWERS
FOR MILL MEN

A Department for the Solution of the Troubles, Large and Small, That Are Encountered by the Workers in the Mills in the Course of Their Duties in Making Paper and Pulp—All Mill Men Are Invited to Send in Both Questions and Answers—A Free Exchange of Ideas Is Desired—By Active Co-operation This Department Can Be Made a General Clearing House for Information in Regard to Practical Paper Making.

Cleaning Drainer Bricks

QUESTION No. 2525.—I would appreciate it very much if you could inform me through your practical page whether there is any way to clean drainer bricks in which the holes have become clogged, to make them serviceable again.

ANSWER No. 2525.—The holes may be bored out with a mechanically driven flexible steel drill, or another method, which does the work quite thoroughly is to place the bricks in a concentrated solution of hydrochloric acid which dissolves the deposits formed by lime used in cooking and the chloride of lime used in bleaching. The bricks are first thoroughly cleaned in water with a stiff brush. They are then put into a wooden box and the hydrochloric acid poured over them. After 12 to 24 hours, according to the concentration of the acid, they are removed and washed with water, after which they are ready for use.

Treatment of Cotton Linters

QUESTION No. 2526.—I am an interested reader of the Question column of the PAPER TRADE JOURNAL and believe it would be better appreciated if taken greater advantage of.

Will you please answer the following through the column: Can you give me any information regarding the treatment of cotton linters; how best to prepare them in a mill using a good length of stock (sulphite and soda) on machine and beating only about two hours?

ANSWER No. 2526.—I do not think that cotton linters can be economically used when given only two hours in the beaters, that is, in the condition they are at present being marketed. The difficulty lies in brushing out the balls of fibre, of which there is a considerable percentage. Then, again, the nature of the fibre itself demands a prolonged treatment in the beater to be properly hydrated to get the maximum benefits of which the fibre is capable. You might possibly use this fibre successfully by using not more than five or six per cent in your furnish. You could also give them a brushing out in the rag washers, and empty into drainers, from which they must be taken and furnished into the beaters. This procedure would add considerably to the cost of the linters.

Trouble with Curling of Coated Board

Question No. 2527.—We are having a great deal of trouble with curling of light patent coated board, calipering .025 and under. We are running a five-cylinder 72-inch machine. The furnish of the coated side is about 50 per cent Sulphite, 50 per cent Blanks, Size, Alum, Clay. The tendency is to curl towards the coated side which is the top. Can you suggest a remedy for this defect in your column?

Answer No. 2527.—We will first go over the important factors which cause curling. These are: Slow stock, either by excessive beating, or by being naturally slow, poor formation on the machine wire, uneven couching and pressing, forced drying, draws too tight at wet end of machine, too much size in the furnish.

Of the above factors which tend to make paper curl, slow stock is the greatest to contend with. I should say that your furnish of 50 per cent sulphite and 50 per cent blanks is giving you slow stock, and if this is the case, it is therefore the main cause of your curling trouble. I would suggest cutting down on your blanks and make it 50 per cent sulphite, 25 per cent blanks and 25 per cent soda.

Give the stock sharper treatment if possible, both in the beaters and jordans, run stock as short as is consistent with strength of paper. To get best possible formation, the couch and presses must be in first class condition to insure an even pressing of the sheet. Weigh presses as heavily as possible in order to reduce amount of water to be evaporated by the dryers. Run the draws between presses and couch as slack as possible. The first two or three dryers should not be very hot and the drying effected as gradually as possible. An ample amount of drying surface is essential to producing a flat paper. See that the paper is not too hard sized, just enough to prevent too great an absorption of the coating material.

Of course the above outline applies more strictly to the prevention of slow stuff from curling. Given a free stock the troubles from curling are very slight. I am quite confident that the suggested change in your furnish will reduce your trouble to a large extent. If it does not do so to your satisfaction, I would recommend a more drastic change in the furnish to obtain a freer stock if it is consistent with the quality of your paper.

Slow Progress on Study of Paper Industry

[FROM OUR REGULAR CORRESPONDENT.]

WASHINGTON, D. C., November 17, 1920.—The study of the paper industry which is being made by the United States Tariff Commission is evidently not proceeding very swiftly. Only two men are now working on this study, which is being made merely for the files of the Commission and not for the purpose of making a public report as some have thought.

It has been the policy of the commission for some time to carry on studies of various industries so that when it is called upon to produce facts by Congress regarding any one industry, these facts will be in hand with little trouble. When the facts have once been obtained by the commission, it will be easy enough to keep these facts up to date, according to the commission. That is the stage of the paper study, namely the making of the first investigation.

Up to this time the commission has not sent out any questionnaire to the trade, but one probably will be sent out in the future. It is believed that the Commission will wait to see what the Tariff Committee of the American Paper and Pulp Association which met in Chicago last week will have to say before any definite action in connection with the questions is arranged. The matter has been put before officials of the association, officials of the commission say and the paper manufacturers will be given every opportunity to co-operate in making the study a success from the standpoint of the trade as well as of the commission.

Widespread tie-up to American Writing Paper campaign

Full page newspaper advertisements have created more confidence in Printers. More and more buyers are insisting that the Printer specify the paper

TESTIMONIALS and congratulations are still pouring in from Printers and Paper Merchants all over the United States on the full page newspaper campaign that the American Writing has been running. More than 100,000 reprints of these advertisements have been requested for mailing to Printers' customers. Hundreds of electrotypes have been used by the Printers themselves in continuing this campaign.

Co-operation of Wisconsin Typothetae

"We cannot compliment the American Writing Paper Company too strongly on its broad-vision plan of advertising," writes Mr. W. G. Penhallow, Executive Secretary of the Wisconsin Typothetae, in commenting on the campaign, "and we wish to co-operate in every possible way, that the largest harvest of results possible may be reaped in our field, and that in the reaping our printers may garner in some of the wheat for themselves."

The Boston Typothetae Board of Trade requested 400 reprints of the first page, and distributed them to their members.

Franklin W. Heath, Secretary of the Typothetae of Philadelphia, did not even wait to get proofs from Holyoke, but went to the local paper, secured the proofs, sent them to every member with a special announcement, captioned: "Read Every Word." Mr. Heath, in a letter addressed to Mr. W. B. Snyder, of the American Writing Paper Company's Philadelphia office, said in part: "The Typothetae of Philadelphia expresses its appreciation of the broad, constructive thought reflected in your efforts."

B. E. Hutchinson outlines A. W. P. policy

All this is, of course, very gratifying. Our attitude has been well expressed by Mr. B. E. Hutchinson, Treasurer of the Company, as follows:

"The efforts of this company to advertise as much for the benefit of the Printers and Paper Merchants as for itself affords an example of co-operation which will redound to the interests of all.

"Progress demands the systematic co-operation of all the forces or factors bearing on the situation.

"In the paper industry these factors are three—the consumers of paper, principally Printers, Lithographers, etc.; the distributors of paper, the Paper Merchants; and the manufacturers. There appears to be a general recognition of the fact that in the past the co-ordination among these three factors left something to be desired, and that it is now time to improve upon the past—which is of much more practical importance.

"The American Writing Paper Company wants to be thoroughly identified with this forward movement. It is anxious to make its full contribution to the solution of the problems which confront the industry."

AMERICAN WRITING PAPER COMPANY
Holyoke, Mass.

PAPER COMPANY
PAPERS—COVER PAPERS—PAPETERIES—TECHNICAL PAPERS—SPECIALTIES

Ten years ago the Printer was an order chaser—
today he contributes constructive business ideas
How the mill organization and research laboratory of the American W
Company co-operate in raising standards
AMERICAN WRITING PAPER
EAGLE A PAPERS
BONDS—WRITINGS—LEDGERS—BOOK PAPERS—OFFSET PAPERS—COVER PAPERS—PAPETRI
"Eagle A"
PRICE LIST
AMERICAN WRITING PAPER CO.
Makers of Eagle A Papers
Holyoke, Mass.

The Watermark of Excellence

This full page announcement appeared in newspapers throughout the country about October 26. Send for copies of it to send to your principal customers.

AMERICAN WRITING

EAGLE A PAPERS: BONDS—WRITINGS—LEDGERS—BOOK PAPERS—OFFSET

VOCATIONAL EDUCATION AT CHAMPION FIBRE MILLS

J. C. Wright, who is chief of the Industrial Education Service of the Federal Board for Vocational Education, recently visited the evening schools at Canton, N. C., where, through the co-operation of the Champion Fibre Company and the State Board for Vocational Education, evening classes are being conducted for the instruction of the mill employees.

Mr. Wright's report of the work he found in progress at Canton is as follows:

"The Champion Fibre Company operates three mills in Canton. They include sulphite, sulphate, and soda processes, as well as a plant for the manufacture of tannic acid. Their working force includes from 1,200 to 1,500 employees. A new paper mill is being erected which, in the near future, will materially increase the number of employees.

"The management has become greatly interested in giving the employees of the different plants an opportunity to extend their technical training in the processes involved in the manufacture of pulp and paper. Under the direction of the State Board for Vocational Education an organization has been set up for evening classes. This organization includes a local director in charge and fifteen teachers, all chosen from the mills, and most of whom are superintendents of various departments. In order that the organization may more effectively meet the needs of those attending the classes, as well as the industry, an educational committee of five members has been appointed to study the various problems involved in making a more efficient organization.

"The classes as a rule meet two evenings per week at 7 P. M., although some of the classes are held at 3.15 P. M.

"The following courses are included: Chemistry of pulp and paper making, practical electricity, shop practice, general pipefitting, masonry, steam plant practice, blueprint reading and elementary drawing, general millwrighting, pulp making, manufacture of tannic acid, paper manufacture.

"All the instruction given in the classes which I visited was related to the daily employment of the group. In conference with the instructors and the educational committee it was decided that as soon as the text books being compiled by the joint executive committee of the Vocational Education Committees of the Pulp and Paper Industry are available, it will be desirable to reorganize these courses and divide them into a greater number of short units—units which will correspond to those set up in the above mentioned texts. It was the consensus of opinion of those present in the conference that the arrangements made by the above committee for making available the texts in small pamphlets on unit subjects will aid in facilitating the instruction in these classes, especially since it will be possible to place in the hands of the men themselves a textbook on the subject to be studied.

"About 150 employees are enrolled in the several classes. The company expects not only to utilize these classes for the purpose of improving the technical efficiency of its employees, but also to use them as a means of providing a corps of trained workers to manage the new plant being erected, which will not be ready for operation before another year.

"The classes are held in classrooms set apart in the Y. M. C. A. building, which is adjacent to the manufacturing plants, and also in the technical laboratories of the plant itself.

"The subject of foreman training is being considered, but no classes have been formed up to the present time. I believe that a conference on foreman training ought to be held in this vicinity, to which representatives of industries of this kind should be asked to attend. Many of our industries similar to the pulp and paper industry employ large groups of relatively unskilled labor. In such an organization the foreman is the key man and has all the responsibility for technical training in its relation to production.

"The salaries of the teachers are paid from local funds, but reimbursements are made by the State Board for Vocational Education from State and Federal funds."

What the Technical Association Is Doing

A meeting of the Committee on Heat, Light and Power of Tappi was held at Dayton, Ohio, on Monday, November 15, when plans were made for the annual report, which is likely to attract unusual attention from mills in membership. One of the principal subjects of discussion in this report will be the use of pulverized coal as fuel. The scope of the Heat, Light and Power Committee is a broad one, and it is intended to bring up for discussion at the forthcoming annual meeting other subjects of general interest to the technical and operating departments of pulp and paper mills, such as the electrification of machinery, heating and ventilation of buildings, especially machine rooms, steam turbines versus reciprocating engines, etc. All of these subjects have a bearing on increased production and efficiency, and the sessions of the committee at the annual meeting next April should be well attended. The chairman of the committee is Howard S. Taylor, of the Management, Engineering and Development Company, Dayton, Ohio.

William A. Munro, groundwood superintendent, Wisconsin Pulp & Paper Company, Stevens Point, Wis., has accepted the appointment as chairman of the Groundwood Pulp Committee of Tappi, and is now naming his associates.

The third series of Technical Association Papers, which will contain the papers and discussions at the Fall meeting in Saratoga Springs, N. Y., together with special articles, reports, and translations, is now in the hands of the printer, and will be issued at an early date. As an appendix to this volume will be printed the Year Book and directory of members. No more copies of Technical Association Papers, Series II, can be supplied, the edition having been exhausted. Members of Tappi are entitled to one copy of Technical Association Papers, Series III, when issued. Extra copies for members and the public will cost $2.00 each.

Elections to membership in the Technical Association of the Pulp and Paper Industry are reported for the week ending November 13, as follows:

Active: Karl A. A. Lefren, mill engineer, Robert Gair Company, Haverhill Box Board Division, Haverhill, Mass.; Clyde H. McClure, chemist, Menasha Printing and Carton Company, Menasha, Wis.

Associate: Paul Zilske, assistant superintendent, Detroit Sulphite Pulp and Paper, Detroit, Mich.

Junior: Louis W. Mahle, chemist, Ohio Boxboard Company, Rittman, Ohio.

No German News Print Embargo

[FROM OUR REGULAR CORRESPONDENT.]

WASHINGTON, D. C., November 15, 1920—There has been a rumor for some time that the German Government had placed an embargo on the export of news print paper.

Officials at the Department of Commerce state that the German Government has cut down on the allowance of news print paper to be made to the German newspaper publishers. This suggests the idea that there is probably a shortage of news print paper in Germany and that is the reason that we have been receiving a smaller quantity of print paper from Germany than was received some months ago. This may have led to the idea that an embargo had been placed on this paper by the German Government.

New York Trade Jottings

F. M. Rudolph, of Downingtown, Pa., is spending a few days on business in this city.

* * *

It is reported that the New York packers of waste paper cut the wages of their employees 20%, and as a result a strike was called Tuesday afternoon which is affecting the entire waste paper packing industry.

* * *

A great many members of the paper trade in this city attended the Convention of the American Pulp and Paper Association at the Congress Hotel in Chicago, last week, but most of them have now returned and resumed their duties in the various paper houses.

* * *

The November issue of the *Technical Products Economist,* 501 Fifth avenue, listing thousands of items of new and used machinery and equipment for sale will be ready for distribution about the middle of next week.

For the convenience of prospective purchasers, it is divided into five sections—Refrigeration, Power, Pulp and Paper, Tank and Chemical.

* * *

Word has recently been received in this city of the reorganization of the Neo-Cellulose, a society of the alumni of the paper school at the University of Grenoble in France which was forced to suspend activity during the war, but which is now going stronger than ever. Some interesting research work is done from time to time by this society and it issues some very enlightening bulletins in regard to this.

* * *

The Bureaus of The Merchants' Association, day in and day out, are rendering constant and valuable service to the members of the Association and to the business community of New York City in general. The service to members is given in response to requests received. The Traffic Bureau of the Association, for example, during October, satisfied 152 such inquiries. In addition, the Bureau gave attention to general matters of rate readjustment in which every shipper in the city is directly interested. This is the kind of service that business men appreciate especially because it is directly helpful.

* * *

Every day there are 180,000 persons ill in this city, but there are only 30,000 hospital beds. This constitutes a serious menace to the health of New York. Because of overcrowding of apartment houses it is almost imperative that contagious cases be cared for in hospitals. Reduced home space has reacted in forced resort to the hospitals. Hospital building has not only failed to keep pace with the growth of the city's population, but science and experience have so modernized hospitals as to involve a prohibitive expense in bringing the old hospitals up to date. The new Fifth Avenue Hospital will do much toward solving this problem. It is not only a philanthropy to subscribe to the endowment of this hospital, but it is very nearly a necessity. Address communications to the Ways and Means Committee, 294 Madison Avenue; telephone Murray Hill 5700.

* * *

The Waste Merchants' Association of New York held a dinner and its regular meeting at Moquin's Restaurant in this city on Wednesday, November 10. There were twenty concerns represented out of a membership of thirty-six. The main feature of the evening was the discussion of the proposed raising of the minimum freight car load ten to twelve tons, which would bring a good deal of inconvenience upon the packers of waste paper and rags. A committee was appointed to take the matter before the next meeting of the Trunk Line Association and gain a postponement if not a positive abandonment of the proposal. In addition to this there was a discussion of the raising of the annual dues from $20 to $50 which, however, is to include admission to the dinners, of which there will be at least six during the year, for two representatives from each company which is a member of the association. Elections were also held, but there were no changes made in the officers for the ensuing year with the exception of George Carrizzo, who will replace Andrew Ragone on the executive committee.

Kalamazoo Cost Association to Meet

KALAMAZOO, Mich., November 15, 1920—The Kalamazoo Valley Local Division of The Cost Association of Paper Industry will hold its second annual convention and dinner at the Park American hotel, Monday afternoon and evening, November 22. It is a gathering bringing together a large number of representatives in the industry, including cost accountants, executives and superintendents of plants throughout the middle west. (Dinner is to be served at 6.15 P. M.)

An unusually interesting and instructive program has been prepared for the Convention.

The Opening Address of the Convention will be at 3.00 P. M., made by B. E. Hutchinson, treasurer of the American Writing Paper Company of Holyoke, Mass., and vice-president of the Cost Association of the Paper Industry. Mr. Hutchinson's experience has not wholly been confined to the paper industry, he having been connected with a large firm of auditors and accountants, so that his experience in cost work has been somewhat varied. The subject Mr. Hutchinson will use will be the "Practical Application of Cost Work to the Management," using lantern slides to illustrate.

The after-dinner speaker will be Earle G. Barr, of E. G. Barr & Co., Chicago, who will speak on "Systemizers and Cost Accountants." Mr. Barr is a charter member of the National Association of the Cost Association, a member of the Society of Industrial Engineers and a member of the Western Efficiency Society. He is the author of the International Accountants Society's twenty-lesson course on Systematizing and Cost Accounting. It will be remembered that Mr. Barr delivered a very interesting and instructive address before the Accountants and Bookkeepers' Association of Kalamazoo last Spring. His address at that time covered departmental distribution of power, light and general overhead.

Mr. Barr will talk on Paper Mill Cost Accounting and the application of same on Graphic Charts.

Kennebec Paper Co. Nearly Ready to Start

AUGUSTA, Me., November 15, 1920.—The new mill of the Kennebec Paper Company in Augusta will be started in a few weeks with one 158-inch machine, capable of turning out about fifty tons of news print daily. A second machine of like capacity will be added later. The building, which is of fireproof construction, is 322 by 83 feet, and 57 feet high. A building formerly used by the Central Maine Power Company has been purchased by the Kennebec company and will be equipped as a groundwood pulp mill. Six grinders, driven by motors of 1,400 horsepower are being installed. The daily capacity of the plant will be about forty tons.

Ahdawagam Paper Products Co. Change

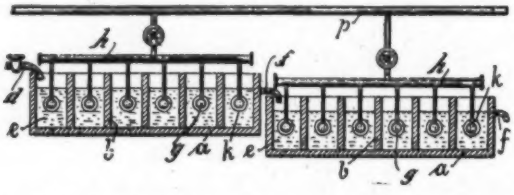
WISCONSIN RAPIDS, Wis., November 15, 1920.—R. L. Bender, formerly of Dayton, Ohio, has recently taken charge of the sales department of the waxed paper division of the Ahdawagam Paper Products Company.

J. W. Chase, formerly in charge of the solid fibre and corrugated box sales at Detroit, Mich., for the Ahdawagam Paper Products Company, has recently assumed charge of the Chicago office of the company, at 10 South La Salle street.

RECENT FOREIGN PAPER MAKING PATENTS

Condensing Sulphite Waste Liquor

Clemens Tittel, of Voitsberg, Austria, has obtained a patent on condensing fluids apt to "burn," such as sulphite waste liquor. A number of condensing troughs, each one higher than the next one, are grouped. The trough, marked *a*, is again divided into different compartments, marked *e*. The compartment walls, marked *b*, are not quite as high as the trough walls, thus forming a connection between the various compartments. Every compartment has a pipe, marked *g*, connected at one end with a steam supply pipe, marked *h*, which pipe, in turn, is fed by a larger one marked *p*. The waste liquor enters the highest trough by a pipe marked *d*, passes consecutively through all the compart-

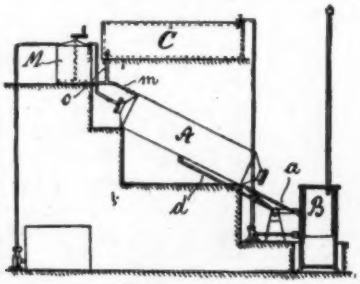


ments of the first trough, and then enters, through *f*, the second trough. Here the performance is repeated, as well as in all the rest of the troughs. The liquid is in constant contact with hot steam pipes, marked *g*, and will gradually thicken more and more, as water will evaporate. The number of troughs to be applied depends upon the amount of liquor to be condensed.

To counteract incrustation, which, while bad in itself, is bound to cause loss of heat, scrapers in ring form, marked *k*, are placed upon pipes marked *g*. By moving the scrapers up and down, all crust formation is removed. The scrapers may be moved by hand, for which purpose they are connected with long sticks, or machinery may do the moving, either periodically or continuously. In the latter case the continuous moving of scrapers, a sort of stirring or pumping movement, helps to accelerate the condensing process.

Norwegian Patent on Semi-Cellulose Production

Two Norwegians, Trygve and Erling Kittelsen, of Christiania, have obtained a patent on production of semi-cellulose by the soda process. Fir and pine logs, about 10 to 13 centimeters in diameter and about 60 centimeters long, are cut lengthwise, thus permitting the lye to permeate the wood. The split logs, dry, are put into the cooker, marked *A*, placed in a slanting position. Then



the lye, clarified, is inducted from container *C* by way of pipes *c* and *m* into the cooker. After the logs are saturated with lye, after a time, part of the lye is withdrawn by way of pipe *a*. Fresh lye, HNaO, from container *M*, is sent into the cooker by way of pipe *m*. Thereupon steam is sent into the cooker by way of pipe *d*. The cooking will last from six to eight hours, and is done under a pressure of from 4 to 9 atmospheres. The duration of cooking has to be regulated according to the dryness of the logs and the texture of the wood.

When the cooking is finished the steam is turned off. The cooker, for about an hour, remains under pressure. Then the lye is withdrawn into container *B* by way of pipe *a*. Next a stream of water is turned on the logs until they are thoroughly washed. The logs are finally taken to the grinder, where they are ground and sorted or cleaned and chopped.

The stock obtained is available for the making of certain paper grades. This semi-cellulose may be used in place of a mixture consisting of cellulose and mechanical pulp.

A New Patent on Sizing

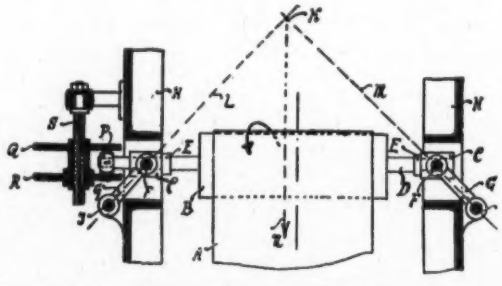
Dr. Max Mueller, of Finkenwalde, has obtained a patent on sizing. He applies a mixture of colloidal matter and water-glass, separating the mixture by acetic precipitants. He first dissolves one part of animal glue in six parts of water, after a manner well known, and adds to this solution, when still warm, a separately obtained solution of water-glass, consisting of one part of water-glass of about 38 per cent. Bé and 8 parts of water. After cooling, sulphurous clay is added while the solution is still fluid. The matter is stirred until all or nearly all of the glue-silicon composition is precipitated. An overdose of precipitant should be avoided.

In a similar manner compositions of glue and starch, casein, rosin, wax, humous acid, etc., may be used. The gelatinous matter is added to the stock in the pulper, where it is treated according to well known precepts, unless acetic reaction has taken place already beforehand.

In order to obtain a good sizing, it is advantageous to add antiseptic matter to the glue-waterglass composition before any precipitation is performed. Similarly, it is preferable to add colors, etc., before precipitation takes place, for in this manner a better permeation of the paper stock and a more perfect diffusion will be obtained.

Automatic Adjustment of Sieve and Felt

Julius Blank, of Dresden, has obtained a patent on an automatic adjusting appliance correcting the running of swinging rollers. The accompanying cut shows the band *A* running over the regulating roller *B*, attached to the axle *D*, running in sockets *C*. Rings *E* are holding axle *D* in place, while sockets *C* are held by pins *F*,



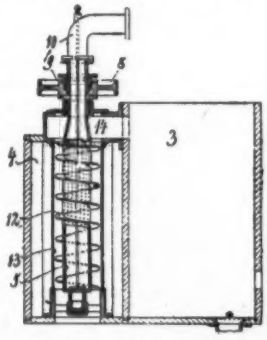
are revolving and based on levers *G*. These forked levers *G* are held by bolts *J*, in turn held by *H*. The levers are in a slanting position, their lines *L* and *M* will cross one another at *K*, their angle being halved by the line *N*. When the lines *L* and *M* cross at *K* the swinging system maintains its proper balance.

When the direction of *N* is diverted to one or the other side, the

correcting appliance acts automatically. The axle *D* has on one end a wheel *P*, running easily between the discs *Q* and *R*, forming a whole. They are attached to a winding spindle, marked *S*, which is parallel to the line *N*. When band *A* is diverted to one side or the other there is initially a tendency to swing roller *D* in a direction opposed to the regulating influence. At the same moment, however, the wheel *P* presses against one of the discs *Q* and *R*, turns them and screws on the winding spindle *S* forward until a new balance is reached and the discs *Q* and *R* are pushed beyond contact. The same procedure is repeated whenever band *A* fails to run in the proper direction.

A New Swedish Screen

The Aktiebolaget Karlstads Mekaniska Verkstads, of Karlstad, Sweden, is manufacturing a new screen upon which it has obtained a patent. The machine has two compartments, marked 3 and 4. Compartment 3 holds the pulp to be screened, while compartment 4 contains the screen itself. The latter is a revolving cylinder, hollow, marked 5, closed at the lower end. The belting turning the cylinder runs on 8, which, by 9, forces the water, running in



by pipe 10, into the cylinder. The cylinder is perforated and has, on its outside, a spiral marked 12. The cylinder, including the spiral, are enclosed in a mantle, marked 13. The space between the cylinder and the mantle has an opening at the top and is connected with compartment 3 by a passageway marked 14.

When the cylinder revolves the pulp passes from 3 through 14 into compartment 4 and runs down the spiral between the cylinder 5 and mantle 13. The water pumped into cylinder 5 squirts through the perforations and washes the finer parts of the pulp through the holes in the mantle 13, which is also perforated. While the finer parts are thus forced out, the coarser particles remain within the mantel and, following the spiral, are forced to the bottom, from where they are removed by an opening.

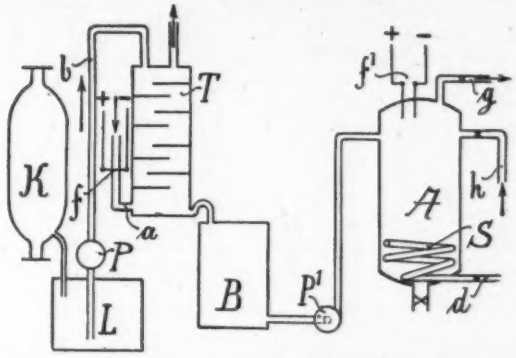
Decompounding Sulphite Lye Waste

Hans Brun Landmark, of Drammen, Norway, has obtained a patent on decompounding the waste liquor of sulphite lye. He uses heat under high pressure. The new process is explained as follows:

From the sulphite cooker *K* the lye is conducted to the lye container *L*. From there the lye is pumped by pump *P* into the tower *T*, by way of pipe *b*. Tower *T* has expansion or contact surfaces, arranged alternately. They are to spread the lye as much as possible, thereby forcing the lye to absorb gas consisting of SO_2 and SO_3. This mixture of gas comes from the fireplace and enters, after it is treated on the way, tower *T* by way of pipe *a*. This pipe has an electric appliance, marked *f*, which causes part of the sulphurous acid, SO_2, to become oxidized by the surplus air contained in the carbon gas and to be converted into SO_3.

The lye, leaving tower *T*, absorbs the mixture of gas formed in pipe *a*, consisting of SO_2 and SO_3, and then runs off into container *B*. The gas which is not absorbed by lye in tower *T* still contains remnants of sulphurous acids, while the anhydrous sulphurous acid, SO_3, is completely absorbed by the lye. Sulphurous acid thus obtained may be used in any convenient manner.

From container *B* the lye, containing SO_2 and SO_3, is pumped



by pump P^1 into boiler A, which is supplied with carbon gas from the fireplace or with a mixture of SO_2 and air by a pipe marked *h*. Surplus gas escapes by pipe *g* or by passing through electrical appliance marked f^1. Steam enters the boiler by way of pipe marked *d*, which ends within the boiler in coil *S*.

In case the lye in tower *T* does not receive enough SO_2 more carbon gas or a mixture of SO_2 and air may be inducted by way of pipe *b*, while at the same the electric appliance *f* begins action.

Boiler *A* is then heated by steam, entering by way of *d*. When the heat is high enough the lye is decompounded, lignin being secreted. Hereby sulphurous acid is gained, to be used over again as described above. In pipe *g* a valve works automatically as soon as steam pressure in boiler *A* reaches a certain degree. Here sulphurous acid escapes continuously as soon as the valve is opened. This acid, separated from lignin compositions, may be used in the making of more bisulphite lye.

Slack Season in Miami Valley

[FROM OUR REGULAR CORRESPONDENT.]

DAYTON, Ohio, November 15, 1920—Most of the paper mills of this section are experiencing a slack season. The condition which has existed for two or three weeks is said to be due, more than anything else, to the uncertainty of prices. Most of the plants in Dayton, Hamilton, West Carrollton, Franklin and Middletown are running on part time, in Franklin on half time. Some manufacturers have been able to continue without reducing forces, but may adopt the plan of curtailment if the situation does not change soon. A better feeling has pervaded trade circles since the election, and not a few mill men are inclined to believe that conditions will be righted in a short time. The period of readjustment is affecting practically every line of endeavor, they assert, and paper men should expect to take "the bitter with the sweet."

No alarm has been expressed in mill circles. On the other hand, optimism rules. Manufacturers have anticipated a period of slack orders but they are hopeful that it will not continue long, nor result in a general laying off of mill forces, a condition which would be regrettable.

As far as can be learned this step is not expected by any of the manufacturers unless it proves actually necessary.

Freight is moving more steadily and instead of a shortage of cars it is indicated there may be a surplus of equipment. Traffic has been reduced in volume substantially. Mill owners are securing a fair amount of coal though the coal shortage still is a factor to be contended with.

Machinery manufacturers have not noticed the slackening as much as manufacturers and dealers in paper, it is said. However, if mill conditions become acute there is no doubt it will have a serious effect on that industry.

PULP EVALUATION AS AFFECTED BY THE FIBRE IN THE TEST SHEETS

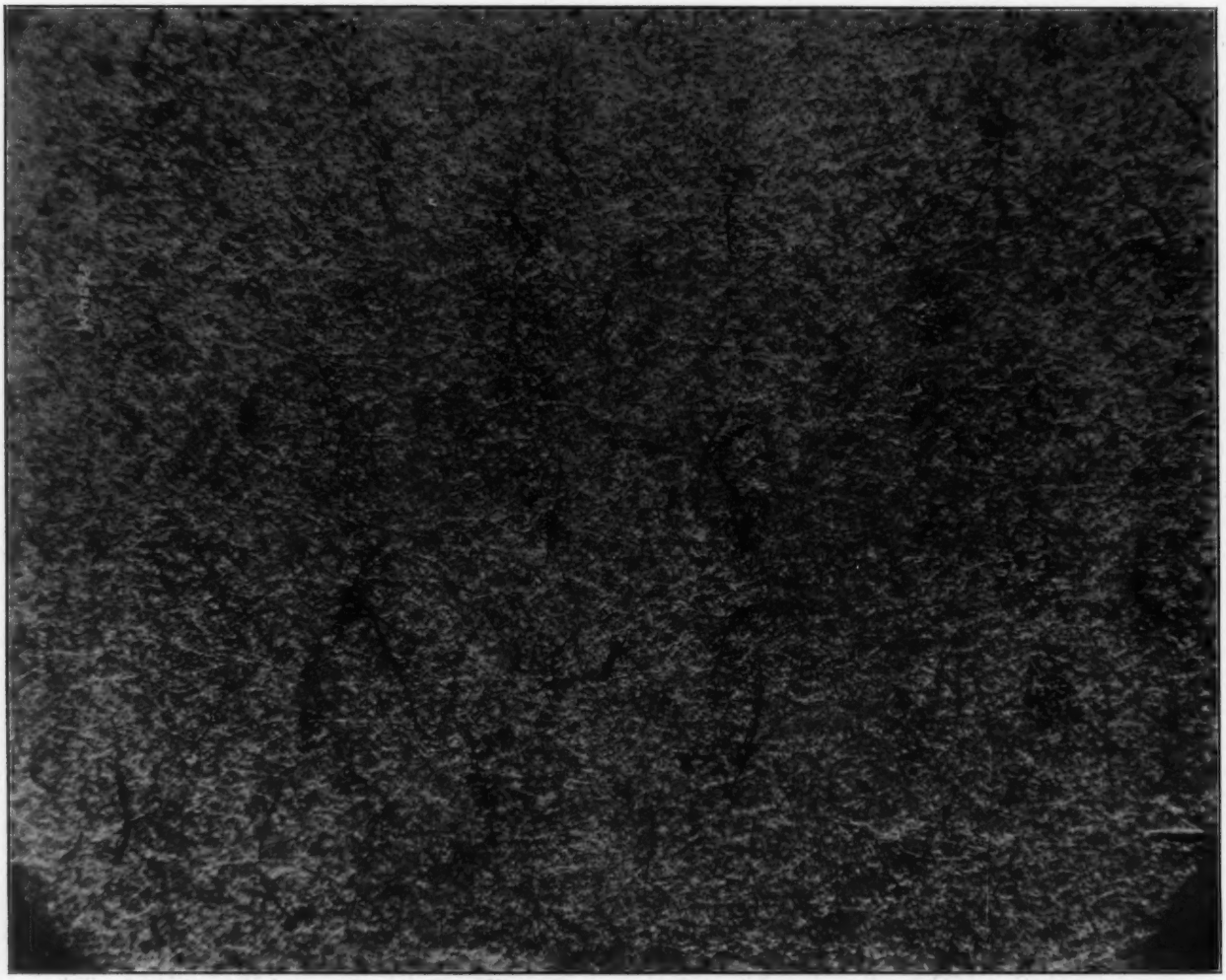
By C. L. Bachelder, Assistant Chemist in Forest Products, U. S. Forest Products Laboratory, Madison, Wis.

The purchaser of pulp who still determines the strength of his pulp from that of a hand sheet made from the pulp doubtless realizes the weakness of this method but uses it for the want of a better. The method in brief is somewhat as follows.[1] The pulp to be tested is beaten in an experimental beater or ball mill and then made into hand sheets. The sheets are then tested for strength, usually by the "pop" test. In many of the tests reported in this paper, on account of the size of the sheet, the Ashcroft tester was used. The method described has a number of very objectionable features, such as a personal equation, a machine direction to the fibres, and an uneven sheet. That a personal equation enters into the making of hand sheets cannot be denied, as it is almost impossible for one person to produce identical duplicate sheets, and still more so for two operators. A machine or fibre direction exists to a greater or less degree, depending upon the method of handling the mold. An even sheet may be defined as one having for every fibre running in one direction an equal number of fibres running at right angles to the first. Such a sheet may be called a 100 per cent sheet and should test the same in all directions. By the above method of operation it is impossible to eliminate the fibre direction and obtain an even or perfect sheet. Because of these conditions the following experiments were undertaken at the U. S. Forest Products Laboratory, with the hope that some light might be thrown upon the problem.

The furnish used was composed of 50 per cent of bleached aspen soda and 50 per cent of spruce sulphite. To 23 pounds of this mixture was added 0.165 pound of the same mixture, which had been colored blue. After this was well mixed in the beater, it was dumped into the stock chest; part was then run over the paper machine in a regular machine run, and part was drawn off from the chest to be made up later into hand sheets. The above

(*Continued on page* 155)

[1] "Testing Pulp for Color and Strength," by Robert Wolf, in *Paper*, Vol. XIX, No. 9, p. 11, Nov. 8, 1916: "A Beating Test for Paper-Making Fibres," by E. Sutermeister, in *Paper*, Vol. XVII, No. 11, pp. 10-15.



A Machine Made Sheet of Paper

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PUMPS

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Read the Next Three Pages

Du Pont Chemical Co.
Incorporated
Wilmington, Delaware
Parlin, N. J. Haskell, N. J. Carney's Point, N. J. Hopewell, Va.

DU PONT

Here is the List

STEAM PUMPS

P. C.	Maker	Quantity	Size, In.	Discharge, In.	Suction In.	G.P.M.	Water Pressure	Type	Plant
183	Worthington	1	12x18x2¾x12	...	...	25	3500	P. H. Hyd. Compound Duplex..	Hopewell
2093	Gardner	9	4½x3¾x4	1½	2½	56	75	P. H. Hyd. Compound Duplex..	Carney's Pt.
2098	Snow	25	6x2½x6	2	3	39	....	P. H. Hyd. Compound Duplex..	Carney's Pt.
908	Worthington	1	12x7x10	5	6	300	....	Duplex	Haskell
117	Worthington	11	6x9x8½x10	5	6	300	75	Com. Du.	Carney's Pt.
2067	Worthington	1	14x20x2½x12	...	...	30	....	Comp. Du.	Carney's Pt.
193	Worthington	9	16x25x3¼x18	...	...	58	3000	Comp. Du.	Carney's Pt.
57	Worthington	1	20x10x5	...	...	300	....	Du. Packed Piston	Hopewell
74	Snow	1	14x7x12	...	...	410	....	Du. Piston	Haskell
78	Gould	1	2½x8	...	...	11	....	Triplex-H. P.	Haskell
79	Gould	1	2½x8	...	...	11	....	Triplex-H. P.	Haskell
215	Worthington	1	10x16x10¼x10	...	...	...	....	Comp. Du.	Haskell
223	Worthington	3	6x2½x6	2	3	33	500	Du. Packed Piston	Haskell
229	Worthington	1	4½x3¾x4	1½	2	57	75	Du. Packed Piston	Haskell
241	Worthington	1	4½x3¾x4	1½	2	...	....	Duplex	Haskell
243	Worthington	1	4¾x3½x6	1¼	2	25	....	Simplex	Haskell
287	Worthington	2	5¼x4¾x5	2	3	107	75	Du. Packed Piston	Haskell
297	Snow	1	6x2½x6	1	1½	33	500	Du. Packed Piston	Haskell
309	Worthington	1	4½x3¾x4	1½	2	57	75	Duplex	Haskell
789	American	1	4x6x8	...	...	...	....	Duplex	Haskell
2092	Worthington	11	3x2¾x3	...	...	24	....		Carney's Pt.
311	Worthington	1	4½x3¾x4	1½	2½	56	75	Du. Packed Piston	Parlin
296	Dean	1	5¼x4¾x5	2	3	106	75	Du. Packed Piston	Parlin
322	Dean	2	6x2½x6	1	1½	35	500	Du. Packed Piston Brass Fitted.	Parlin
323	Dean	2	6x6½x6	1	1½	35	500	Du. Packed Piston Brass Fitted.	Parlin
324	Dean	3	6x2½x6	1	1½	35	500	Du. Packed Piston Brass Fitted.	Parlin
325	Dean	3	6x2½x6	1	1½	35	500	Du. Packed Piston Brass Fitted.	Parlin
621	Worthington	2	10x16x16x12	...	...	200	....	Hydraulic	Parlin
620	Worthington	2	14x20x2¾x18	...	...	...	....	H. P. Hydraulic	Parlin
655	Dean	5	6x9x8½x10	5	6	470	75	Governor	Parlin
16	Worthington	7	14x20x12x15	8	10	1175	...	Compound Du. Packed	Hopewell
1033	Worthington	1	10x10¼x10	7	8	688	75	Brine	Carney's Pt.
2304	Roberts Filter Co.	2	2¼x4	½	½	...	60	Du. Plunger	Carney's Pt.
11	Worthington	6	16x25x22x24	...	...	4500	....	Compound Du.	Hopewell
14	Worthington	1	16x10½x10	5	6	516	150	Du. outside packed	Hopewell
23	Worthington	2	18x22x24	18	18	3000	...	Du. inside packed	Hopewell
30	Worthington	2	9x14x10½x12	7	8	640	70	Comp. dis. inside packed	Hopewell
1477	Worthington	6	12x7x10	5	6	300	200	Du. outside packed	Hopewell
78	Worthington	2	4½x3¾x4	1½	2½	57	75	Plunger and ring	Repaune
258	Worthington	1	5¼x4¾x5	2	3	106	75	Du. packed piston	Parlin
318	Snow	3	6x2½x6	1	1½	35	500	Du. packed piston	Parlin
1352	Worthington	2	3x2¾x3	1	1½	24	75		Parlin
195	Worthington	1	10x6x12	4	5	263	150	Du. outside packed	Carney's Pt.
264	Marsh	1	12x7x12	4	5	200	105	Outside packed plunger	Carney's Pt.
706	Worthington	2	6x5¾x6	...	...	200	....	Du. brass fitted	Carney's Pt.
1993	Blake & Knowles	1	14x7¼x12	...	...	500	150	Serial No. 216,442	Carney's Pt.
2022	Worthington	1	14x20x10¼x10	...	...	300	....	Du. plunger boiler feed	Carney's Pt.
2122	Davidson	2	5¼x3¼x8	...	...	35	50	Simplex	Carney's Pt.
2497		1	7x1x7½	...	...	3 2/3	5000	Double acting high pressure	Carney's Pt.
2539	Worthington	29	5¼x4¾x5	...	...	106	....	Duplex	Carney's Pt.
218	Worthington	1	4½x3¾x4	1½	2½	57	75	Du. piston, brass lined	Haskell
231	Worthington	1	5¼x4¾x5	2	3	107	75	Du. piston packed brass	Haskell
257	Worthington	1	6x9x8½x10	5	6	300	75	Du. piston	Haskell
288	Worthington	2	6x9x8½x10	5	6	300	75	Du. piston, bronze rods	Haskell
185	Worthington	1	6x9x8½x10	5	6	300	75	Du.	Haskell
295	Worthington	1	5¼x4¾x5	2	3	107	75	Du. piston packed	Haskell
300	Snow	4	6x2½x6	2	2½	33	500	Du. piston	Haskell
301	Blake Duplex	1	9x14x7x12	...	...	...	200	Compound duplex	Haskell
303	Snow	2	6x2½x6	2	6	33	500	Du. piston, brass	Haskell
311	Worthington	2	5¼x4¾x5	2	3	106	....	Du. piston, brass	Haskell
315	Snow	1	16x1½x12	..	....	10	5000	Du. ram pattern	Haskell
558	Knowles	1	4x8x3½	...	...	...	....	Single cylinder	Haskell
956	Worthington	1	5¼x4¾x5	2	3	106	....	Du. piston packed	Haskell
957		1	4½x2½x3¾	...	...	25	....		Haskell
960	American	1	3x3½x2½	1	1½	37	....	Single cylinder	Haskell

CENTRIFUGAL PUMPS

P. C.	Maker	Quantity	Discharge, In.	Suction, In.	G.P.M.	Head	Type	Drive	Plant
1560	Kutztown Fdy. Co.	3	3	4	332	40	Vertical	Belt	Hopewell
1563	Kutztown Fdy. Co.	1	3	4	332	40	Vertical circulating	Belt	Hopewell
1567	Rumsey	1	3	4	332	50	Vertical	Belt	Hopewell
1	Rumsey	1	3	4	200	..	Sludge pump	....	Carney's Pt.
4	Swaby	1	2½	2½	175	80	Sludge pump, 3 section 18 ft. dis. head	Belt	Carney's Pt.
4254	Earl Gear and Mch. Co.	1	8	10	2500	80	DSV	Belt	Hopewell
4293	Kutztown Mch. Co.	11	3	4	....	..	DSV	Belt	Hopewell
4552	Shevlin	4	3	6	....	..		Belt	Hopewell
4402	Pusey & Jones	45	3	6	....	..		Belt	Hopewell
2166	American	20	2½	2½	....	..	A	Belt	Carney's Pt.
2168	Allis-Chalmers	2	4	...	57	..		Belt	Carney's Pt.
282	Pusey & Jones	1	2	3	175	40	R. Hand. vertical	Belt	Hopewell
839	Rumsey	1	3	4	332	40		Belt	Hopewell
3964	Shevlin	11	3	4	322	40	Circulating	Belt	Hopewell
4162	Shevlin	1	3	4	400	40	Lead Antimony	Belt	Hopewell
2176	Pusey & Jones	3	5	5	...	..	Lead housing	Belt	Carney's Pt.
3146	American	4	2½	3	260	30		Belt	Carney's Pt.
3147	American	4	2½	3	260	30		Belt	Carney's Pt.
4553	Shevlin	11	6	8	990	50	Horizontal brass fitted	Belt	Hopewell
4551	Pusey & Jones	16	3	6	332	50	Horizontal brass fitted	Belt	Hopewell
258	Pusey & Jones	1	3	6	...	..	Fan	Belt	Haskell
283	Pusey & Jones	1	3	5	332	40	Vertical fan	Belt	Haskell
764	Morris	1	5	6	1050	..	Brass Hory pump with primer	Belt	Haskell

DU PONT

War Surplus Pumps

CENTRIFUGAL PUMPS—Continued

P. C.	Maker	Quantity	Discharge. In.	Suction. In.	G.P.M.	Head	Type	Drive	Plant
788	Morris	1	5	6	....	..	Vertical	Belt	Haskell
2171	Pusey & Jones	2	6	8	990	40	Vertical	Belted	Carney's Pt.
2172	Pusey & Jones	1	3	3	332	40		Belted	Carney's Pt.
4550	Shevlin	3	2	4	125	50	Horizontal	Belt	Hopewell
4550	Rumsey	1	2	2½	125	50	Horizontal	Belt	Hopewell
166	Earl	2	3	3	200	50	"D. S. V."	Direct	Parlin
168	Lea	1	3	3	200	50	"D. S. V."	Direct	Parlin
733	Worthington	1	6	5	600	40		Belt	Parlin
832	American	1	2½	3	185	125	Vertical	Belt	Parlin
830	American	1	2½	3	185	125	Vertical	Belt	Parlin
4552	Shevlin	14	4	6	590	50	Horizontal	Belt	Hopewell
4552	Pusey & Jones	23	4	6	590	50	Horizontal	Belt	Hopewell
4554	Gould	6	5	6	750	50	Horizontal	Belt	Hopewell
541		1	1	1½	....	..		.....	Carney's Pt.
200	Pusey & Jones	1	3	3	....	..	Horizontal	Belt	Hopewell
72	Allis-Chalmers	2	6	6	900	120	Save all	Motor	Hopewell
4254	Earl	4	8	10	2600	80	Save all	Motor	Hopewell
6544	Pusey & Jones	24	4	6	590	50		Belt	Hopewell
6542	Pusey & Jones	10	6	8	990	50		Belt	Hopewell
6542	Shevlin	2	6	8	990	50		Belt	Hopewell
6543	Gould	1	5	6	805	50		Belt	Hopewell
6545	Pusey & Jones	4	3	6	332	50		Belt	Hopewell
252	Pusey & Jones	1	4	6	590	50	Fan	Belt	Haskell
376	Kutztown Fry. & Mch. Co.	1	3	4	275	50	Acid	Belt	Haskell
382		2	3	4	275	50	Acid	Belt	Haskell
653		1	3	4	275	50	Acid	Motor	Haskell
955	Rumsey	1	2½	2½	....	..		Belt	Haskell
831	American	4	2½	3	185	125		Belt	Parlin
165	Allis-Chalmers	1	2	2	225	50		Motor	Parlin
136	Lea	1	5	6	660	190	High Duty Boiler Feed	Steam	Carney's Pt.
137	Earl	1	5	8	1300	80	Frame	Motor	Carney's Pt.
144	American	2	1	1½	....	..		.....	Carney's Pt.
2143	De Laval	1	3	3	200	50		Motor	Carney's Pt.
2151	Cameron	1	8	8	1500	80		Motor	Carney's Pt.
2152	De Laval	2	8	8	1500	80		Motor	Carney's Pt.
2153	Lea	1	8	8	1300	80		Motor	Carney's Pt.
2167	American	5	1	1¼	15	25		Belt	Carney's Pt.
2169	Lea	1	10	10	2700	80	High Duty	Motor	Carney's Pt.
2438	American	2	3	4	265	125	E. E.	Belt	Carney's Pt.
2540	Pusey & Jones	2	4	6	....	..		Belt	Carney's Pt.
2541	Shevlin	1	4	6	....	..		Belt	Carney's Pt.
2543	Pusey & Jones	3	3	4	....	..	Acid	Shaft	Carney's Pt.
2544	Pusey & Jones	3	4	6	....	..	Acid	Shaft	Carney's Pt.
2545		5	3	4	....	..	Acid	Shaft	Carney's Pt.

MISCELLANEOUS PUMPS

P. C.	Maker	Quantity	Discharge. In.	Suction. In.	G.P.M.	Size	Type	Drive	Plant
390	Rumsey	1	1¼	1	20		No. 197 force pump	Belt	Cap Works
1128	Dean	4	..	..	25		Hydraulic triplex	Direct	Carney's Pt.
1219	Meyers	1	4	4	..		Power vacuum	Belt	Cap Works
30	Worthington	2	8	7	440		Compound duplex, inside packed	Direct	Hopewell
101	Blade Co.	1	2	2	..		Hydraulic duplex, outside packed	Direct	Hopewell
834	Pusey & Jones	9	..	6	30		Acid proof	Belt	Carney's Pt.
81	Dean	1	..	..	15	2x10 in.	Vertical triplex	Direct	Haskell
82	Snow	1	..	..	10	16x1½x12 in.	Hydraulic ram pattern	Direct	Haskell
187	Watson Stillman	1	..	..	30	2¾x4 in.	L. P. Hydraulic	Belt	Haskell
233	Pusey & Jones	1	..	..	..	4 in.	Left hand vertical discharge	....	Haskell
304	Pusey & Jones	1	6	8	..	14x6x2 3/16 in.	Vertical	Belt	Haskell
315	Snow	1	..	..	10	16x1½x12 in.	Du. ram	....	Haskell
2035	G. & B.	1	..	..	..		Long distant gasoline	Direct	Carney's Pt.
2165	American	2	..	..	120		Walking beam, well	Belt	Carney's Pt.
2189	American	2	..	..	..		Deep well pump	Belt	Carney's Pt.
226	American	2	..	..	140		Deep well	Belt	Hopewell
4556	Gould	1	1½	1¾	..		Hand test	....	Hopewell
1499	Rumsey	..	..	..	..		Rotary pump	Belt	Parlin
227	Rumsey	1	1	1¼	13		Rotary	Belt	Haskell
84	Gould	1	8	10	592	11x12 in.	Triplex	....	Haskell
1443	General Mfg.	1	6	8	100	6x8 in.	Triplex	Motor	Hopewell
4556	Gould	1	1¾	1½	..		Hand lever	....	Hopewell
6558	Dining	1	..	1¾	..		Hand lever	....	Hopewell
1999	Blake-Knowles	1	..	..	500	14x7¼x12 in.	Fire pump	....	Carney's Pt.
135	Gould	1	..	..	150	6½x8 in.	Triplex	....	Carney's Pt.
147	Carney's	1	2	2½	43	14x3x1 5/6 in.	No. 5 Rotary	....	Carney's Pt.
1370	Gould	2	4	4	150	6x8 in.	Triplex motor	....	Carney's Pt.
1992	Worthington	1	4	5	235		High Duty	....	Carney's Pt.
1540		1	4	4	400		Pulsometer-Steam	....	Parlin
1569	Rumsey	1	2	2¼	..		Force	....	Parlin
1567	Worthington	1	2½	3	..		Turbine	....	Parlin
1461	Rumsey	1	..	..	..		No. 5	....	Parlin
645	Parlin	1	5	5	273		Triplex	....	Parlin

DIAPHRAGM PUMPS

P. C.	Maker	Quantity	Suction	Type	Drive	Plant
254	Del. Electric and Supply Co.	4	4 in.	Hand operated	....	Carney's Pt.
254	Del. Electric and Supply Co.	2	3 in.	Hand operated	....	Carney's Pt.
4223	Edison	1	3 in.	Hand diaphragm	....	Hopewell
4556	Gould	1	1½ in.	Hand rest pump	....	Hopewell
4171	Gould	3	3 in.	Diaphragm	Hand	Hopewell
3373	Rumsey	1	3 in.	Diaphragm	Belt	Haskell
682	Ransome	1	2½ in.	Diaphragm, direct connected to gasoline engine	Direct	Haskell

WE'LL talk your language when you ask for quotations on these pumps. We have cut the prices to the bone. The saving is yours. These pumps are part of our war surplus. That is why we can sell them at such low prices. In fact, our prices are so low, that some dealer is likely to step in and grab them all. Then you will have to pay him considerably more for the pump you want. So buy now for present needs or future replacement.

You don't run your automobile without a spare tire, so why run your plant without one or more spare pumps? We are selling them low enough to make this a very wise move.

Go look at these pumps at our plants or call, write or wire, mentioning our property card numbers.

Du Pont Chemical Co.

Incorporated

Wilmington, Delaware

Parlin, N. J. Haskell, N. J. Carney's Point, N. J. Hopewell, Va.

PULP EVALUATION AS AFFECTED BY THE FIBRE

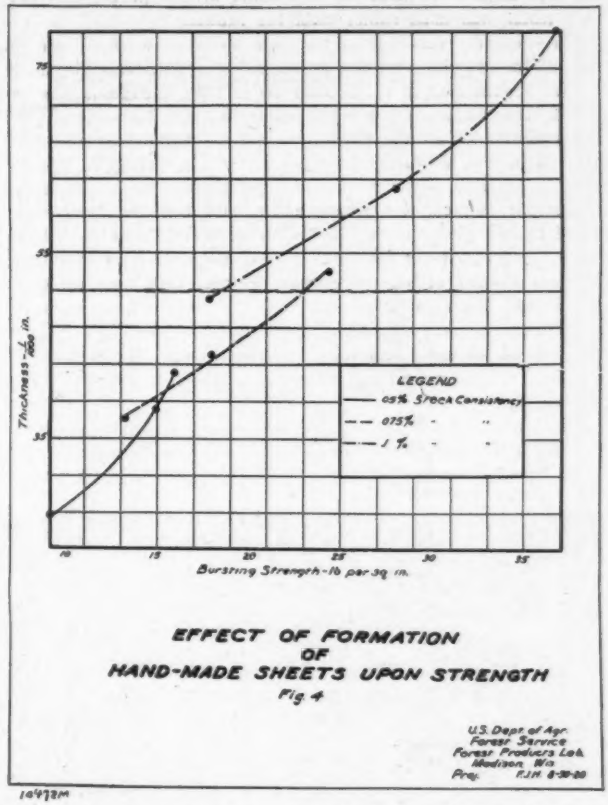
(*Continued from page* 150)

furnish gave a granite sheet, the blue fibres of which were easily distinguished with the aid of an eye-glass. This type of sheet was made so that the fibre direction could be studied.

The hand sheets were made as outlined above, and the customary procedure was followed. To a stone vat, 9 inches by 6.5 inches by 19 inches, was added approximately 15 liters of water and 25 grams of pulp, bone-dry weight. No attempt was made to keep these factors more than approximate, though later various ratios between stock and water were studied by themselves. The hand mold measured 7 inches by 10 inches and was of the usual type. In making the hand sheets, the operator stood in front of the vat, grasped the mold by the ends, dipped it into the stock, and pushed it from his body. If more than one pass was required for thickness or to even up the sheet, the mold was reversed with each succeeding pass.

Effect of Variables

In order to determine whether some of the undesirable factors could not be eliminated, certain variables were introduced in the manner of making the hand sheets. That is, as the mold was raised through the stock, it was given definite rocking motions or shakes. The purpose of this was to give a specific direction to the fibre other than that which it already possessed. Three such variables were studied, and the results are tabulated in Table 1. A-2 had a shake lengthwise of the mold, A-3 widthwise, and A-4 diagonally. Sheets were also made without any attempt at a shake, as in A-6. Another variable, as illustrated by A-29, was obtained as follows: The mold was sunk to the bottom of the vat, and after the stock had been stirred carefully but thoroughly in order to eliminate any currents which might affect the formation of the sheet, and after time had been allowed for the violent agitation to cease, the mold was raised vertically. By this method it was hoped to eliminate some of the currents which are set up when the mold, handled in the usual manner, is passed through the stock. Sheets were also made on a 7-inch round suction mold. The stock was dumped into the reservoir and stirred carefully; suction was then applied, and the sheet was formed on the screen. All of the hand-made and suction mold sheets were couched on pieces of felt, pressed in a hand letter press, and dried on the dryers of the paper machine to approximately 90 per cent bone dry.



EFFECT OF FORMATION OF HAND-MADE SHEETS UPON STRENGTH

Fig. 4

TABLE 1.

Operator	Sheet No.	Method of formation	No. blue fibres —[1]	No. blue fibres +[2]	Ratio of fibres —	Ratio of fibres +	Weight per ream Lbs.	Thickness. In.	Burst strength, Lbs. per sq. in.	Average burst strength Lbs. per ream per sq. in.	Average burst strength per 1/10000 thick, Lbs. per sq. in.	Average break length, Meters	Average fold, Double	Machine direction Stretch Per cent	Machine direction Fold, Double	Machine across Stretch, Per cent	Machine across Fold, Double
A	0	Straight, 4 passes	417	141	2.958	1	102.0	.0087	59.20	.580	.6803	3,545	790	1.86	1,208	2.30	371
	1	Straight, 3 passes	481	170	2.83	1	70.9	.0062	39.90	.563	.6435	3,592	118	1.94	177	1.92	59
	2	Shake lengthwise —	606	222	2.73	1	71.2	.0081	41.90	.589	.5173	3,194	83	1.36	111	1.56	55
	3	Shake widthwise |	576	204	2.824	1	65.6	.0076	38.60	.588	.5150	3,284	109	1.22	169	1.60	49
	4	Shake diagonally /	578	209	2.767	1	63.6	.0069	35.60	.560	.5160	2,626	43	1.56	62	1.50	24
	5	No reversing, no shake	570	199	2,865	1	62.9	.0064	36.60	.582	.5720	3,069	41	1.84	63	2.24	20
	6	1 pass, no shake	596	200	2.98	1	41.8	.0044	24.10	.577	.5480	2,235	18	1.50	29	1.72	7
	15	2 passes .025%	...	...	.....	..	16.0	.0022	5.20	.325	.2363	.....	...	.....	...	.....	...
	16	1 pass .05	...	...	.....	..	20.8	.0028	9.19	.441	.3225	.....	...	.....	...	.....	...
	17	2 passes .05	...	...	.....	..	33.5	.0040	14.90	.446	.3780	.....	...	.....	...	.....	...
	18	3 passes .05	...	...	.....	..	37.8	.0044	15.93	.422	.3625	.....	...	.....	...	.....	...
	19	1 pass .075	...	...	.....	..	33.0	.0039	13.20	.400	.3385	.....	...	.....	...	.....	...
	20	2 passes .075	...	...	.....	..	39.4	.0046	17.90	.455	.3894	.....	...	.....	...	.....	...
	21	3 passes .075	...	...	.....	..	51.0	.0055	24.35	.478	.4427	.....	...	.....	...	.....	...
	22	1 pass .1	...	...	.....	..	43.5	.0052	17.85	.410	.3430	.....	...	.....	...	.....	...
	23	2 passes .1	...	...	.....	..	59.6	.0064	28.02	.470	.4380	.....	...	.....	...	.....	...
	24	3 passes .1	...	...	.....	..	76.2	.0081	36.67	.481	.4523	.....	...	.....	...	.....	...
	25	1 pass .150	...	...	.....	..	43.6	.0049	17.17	.394	.3505	.....	...	.....	...	.....	...
	26	1 pass .200	...	...	.....	..	60.6	.0066	26.17	.432	.3936	.....	...	.....	...	.....	...
	27	1 pass .025	...	...	.....	..	15.4	.0018	4.82	.313	.2677	.....	...	.....	...	.....	...
	28	.....	...	...	.....	..	.....	.....	.....	.....	.....	.....	...	.....	...	.....	...
	29	Mold raised straight up; no shake	263	228	1.154	1	51.0	.0059	21.36	.419	.3620	1,877	12	2.12	13	2.42	11
	1	Machine made	459	182	2.522	1	38.0	.0028	18.60	.489	.6645	4,295	44	1.60	82	3.20	6
	2	Suction mold	309	291	1.073	1	225.0	.0161	10.17	.452	.6320	4,755	...	...	...	...	...
B	..	Unknown	633	205	3.088	1	61.3	.0065	31.40	.512	.4835	3,159	142	1.46	261	1.83	22
C	..	3 passes	563	202	2.788	1	85.7	.0085	41.30	.482	.4850	3,432	494	1.60	946	2.33	41
C	1	1 pass	508	169	3.001	1	46.6	.0048	26.90	.577	.5605	3,372	38	2.62	55	2.82	22
D	..	Unknown	561	202	2.778	1	75.0	.0076	44.20	.589	.5820	2,945	123	2.70	169	3.36	78
E	..	Unknown	529	193	2.741	1	...	...	.....	.....	.....	.....	...	.....	...	.....	...
F	..	Unknown	445	182	2.445	1	34.1	.0038	18.20	.534	.4785	2,166	72	2.30	8	2.10	6

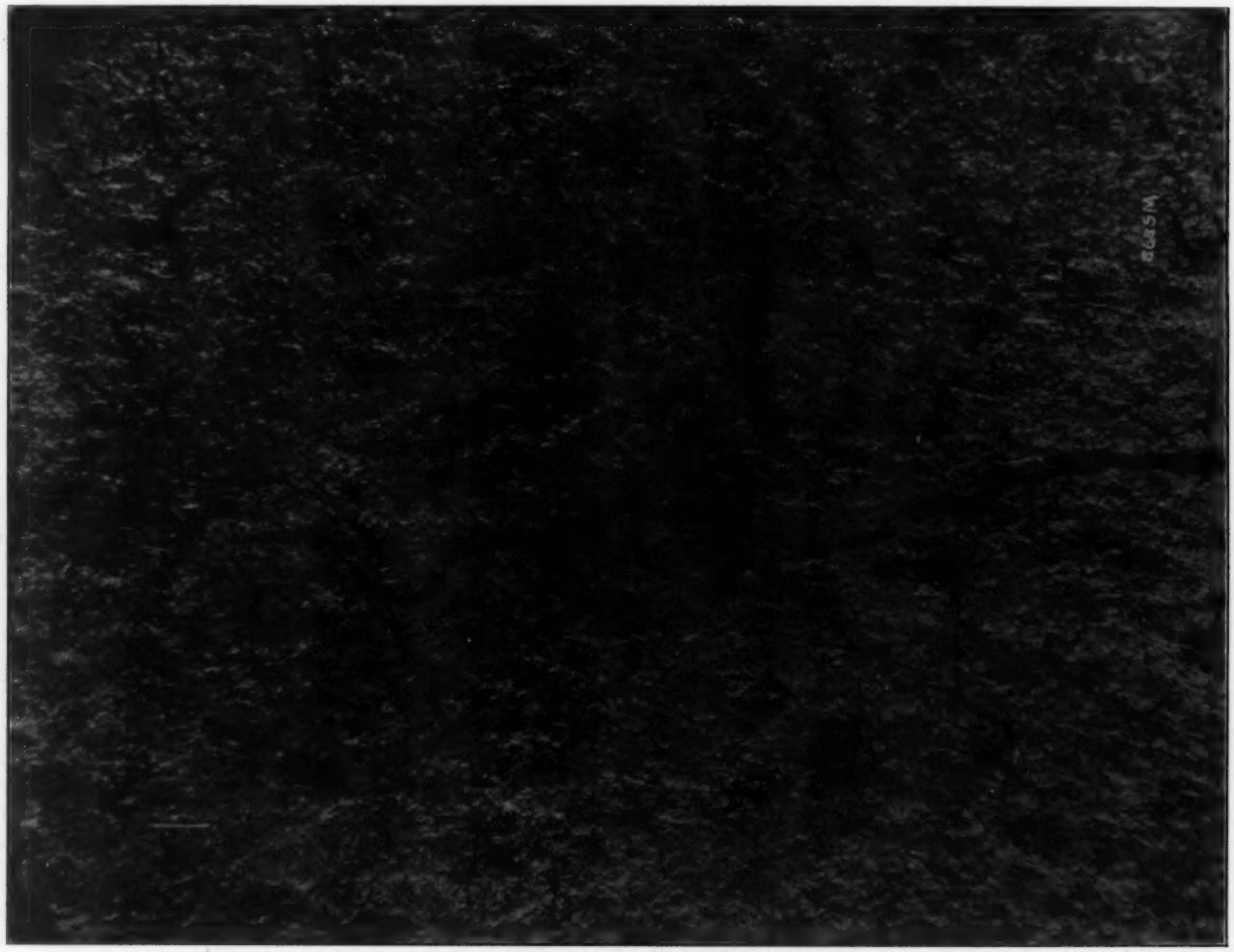
[1]— In machine direction, [2]+ Across machine direction.

Complete strength tests were run on most of the samples under constant conditions of humidity and temperature. The results were not so satisfactory as they might have been if the sheets had been larger. Because of the smaller area required, the Ashcroft tester was used rather than the Mullen.

Fibre-direction readings of the blue fibres were also made on most of the samples, and any future references that may be made to fibre readings refer to the blue fibres only, though it was assumed at the time of the experiments that the blue fibres were representative of all the fibres in a sheet. These readings were taken with the aid of an eye-glass and a glass-topped tracing table. The sheet to be read was superimposed upon a sheet of transparent ½-inch co-ordinate paper, and both of these were placed upon a glass-topped table illuminated from below. Fifteen half-inch squares from different parts of the sheet were examined, the total number of blue fibres was recorded, and their direction was noted. Fibres whose angle with the base was between 45 and 90 degrees were considered in the machine direction. Those which made an angle less than 45 degrees were across machine direction. The same general direction was used for all the fifteen readings.

Fibre directions can, perhaps, be shown best by the three photographs. These are pictures of sections of three different sheets, which have been magnified about 15 diameters. No. 1 is a picture of sheet A-1, No. 2 of sheet No. 1, and No. 3 of sheet No. 2. The dark lines represent the blue fibres, and their direction may readily be seen. In considering the total number of fibres shown in the photographs, it must be remembered that only the surface fibres show in the picture, whereas in the fibre count many under the surface were visible. On account of the difference in the weight and thickness of the sheets, the total readings were considered unsatisfactory for comparison. A ratio, however, was struck between the number of fibres in the machine direction to one across, and this was considered a satisfactory basis for comparing the results which are recorded in Table 1. All samples showed a predominant fibre direction; that is, as the operator pushed the mold from him through the stock, there were currents set up in the vat which produced a very marked fibre direction. As has been stated, an attempt was made to overcome this in certain samples by giving the mold a definite shake, and, while the results were not marked, they are worthy of notice. Take the two sheets A-1 and A-2 from Table 1; A-1 was made in the usual manner, A-2 was made with a lengthwise shake or rock. This was done to eliminate, if possible, the very marked fibre direction which must exist where the general method of operation is followed. The fibre ratios were A-1, 2.83:1; and A-2, 2.73:1. If it is assumed that a perfect sheet is one that would have a fibre

(*Continued on page* 158)



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PULP EVALUATION AS AFFECTED BY THE FIBRE

(*Continued from page* 156)

ratio of 1:1, and if this is represented by 100 per cent, then A-1 is only 35.3 per cent and A-2 36.7 per cent perfect; that is, A-2 was approximately a 4 per cent improvement over A-1. In sheet A-3, which was made with the widthwise shake, the change in the ratio of the fibres was not noticeable. A-4, which was made with a diagonal shake, had a fibre ratio of 2.767:1, that is, it was a 36.2 per cent perfect sheet. This, compared with A-1, indicated a better sheet by 2.5 per cent.

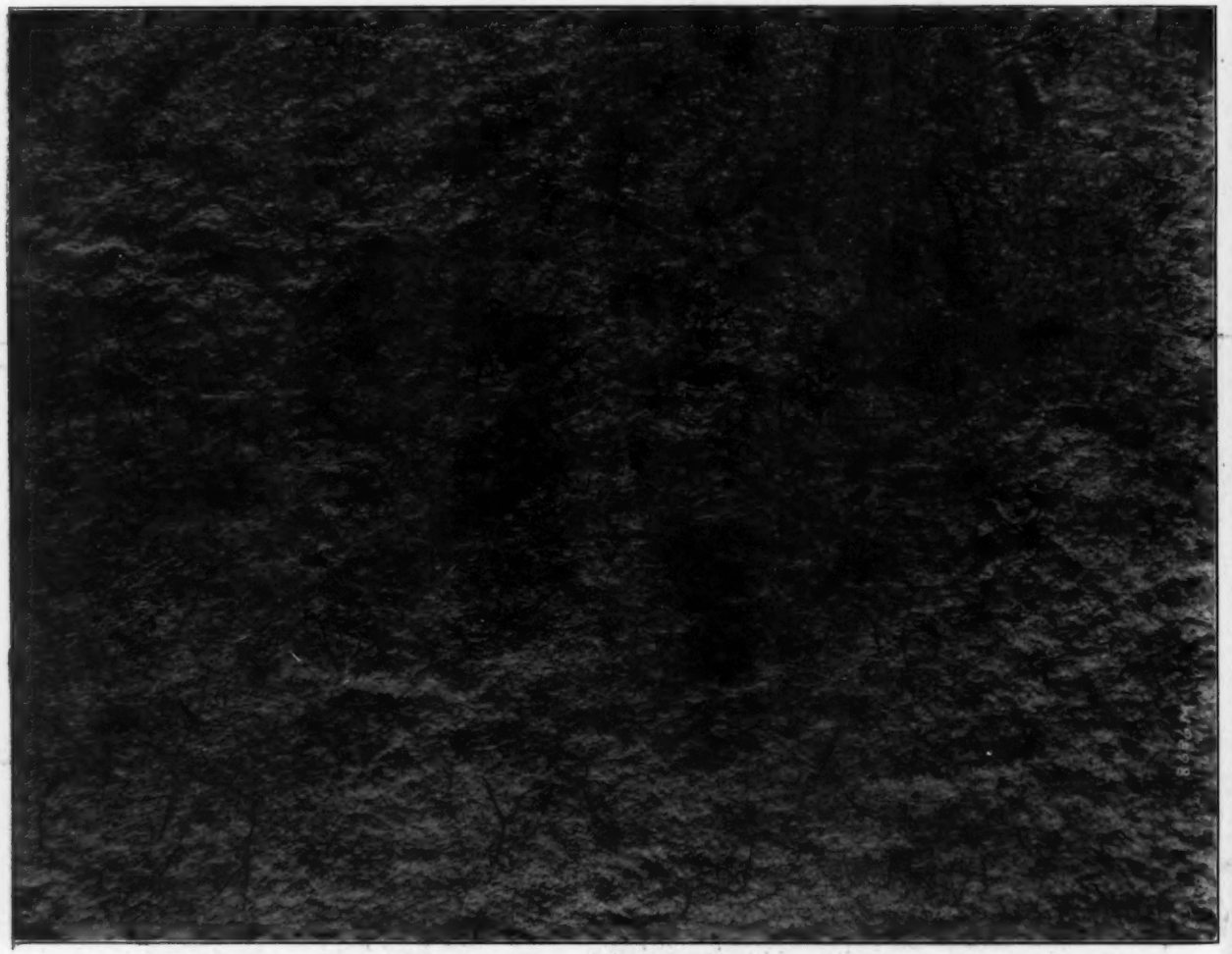
The other variation from the method of forming the hand sheet A-29 resulted in a fibre ratio of 1.154:1, or an 86.8 per cent sheet. This is approximately an increase of 146.5 per cent over A-1. When the strength tests are studied, the results bear out the conclusions indicated by the fibre ratio. For instance, take the double folds in and across the machine direction; for A-1, they are 177:59; for A-29, 13:11. Compare these ratios with the fibre direction values obtained for A-1. The fibre ratio was 2.83:1; and for A-29, 1.154:1; the double-fold ratios, with the smaller value made equivalent to 1, are 3:1 and 1.18:1, respectively. Sample No. 2, made on the suction mold, had a fibre ratio of 1.073:1. In Table 2 is recorded the actual fibre count from the 15 half-inch squares from which the fibre ratio was figured.

TABLE 2.

Square No.	—	+	Square No.	—	+	Square No.	—	+
1	25	23	6	23	18	11	16	11
2	21	18	7	21	22	12	14	9
3	19	16	8	21	19	13	15	15
4	22	25	9	18	18	14	13	18
5	20	16	10	16	19	15	14	12
	107	98	..	99	96	..	72	65

Each of the two columns represents the fibre count in a specific direction. For convenience the directions are called with and across machine direction, though strictly speaking that term should not apply to the present sample. Table 2 is inserted to show the difference in the fibre count obtained from individual squares. While there was a predominance of fibres in one direction, and as the whole count from the individual squares showed that the predominance was not always uniform; in fact, although in most of the counts this excess was in one direction, in some others the reverse was true. For instance, in counts Nos. 1, 2, and 3, the excess was in what is called the machine direction, but in 4, 7, and 10 the opposite was true. No. 2 was a 93.2 per cent sheet and, compared with sheet A-1, showed an improvement of 164.5 per

(*Continued on page* 160)



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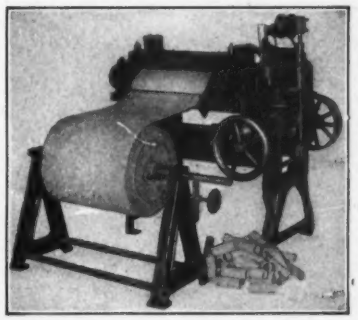

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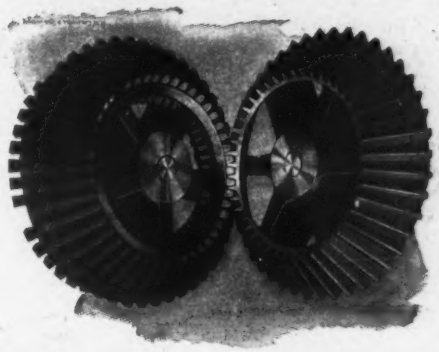

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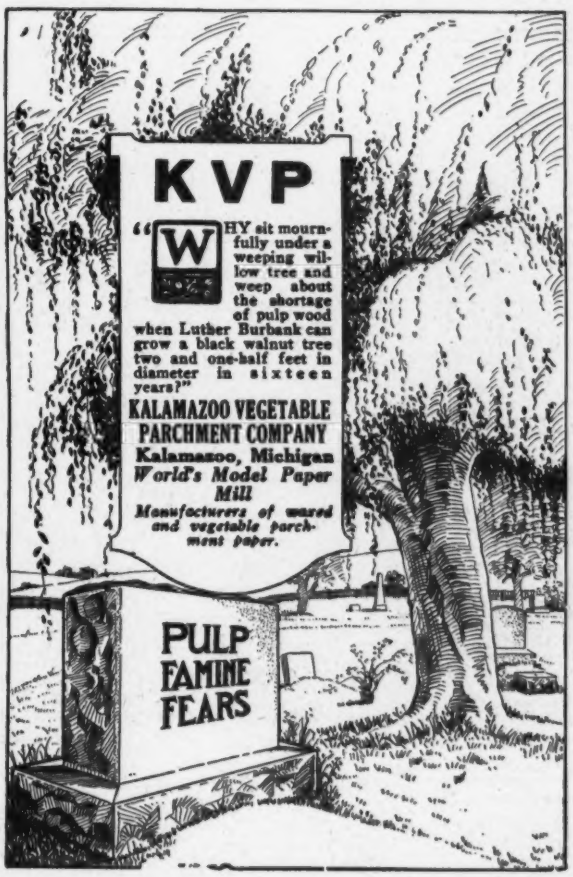
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Fig. 293

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PULP EVALUATION AS AFFECTED BY THE FIBRE

(*Continued from page* 158)

cent; compared with sheet No. 29, No. 2 showed an improvement of approximately 7.4 per cent.

The machine-made sheet No. 1 was 39.6 per cent perfect; this is better than all the hand-made sheets except A-29, which, when compared with No. 1, showed a 119.3 per cent improvement, and sample No. 2 a 135.3 per cent improvement.

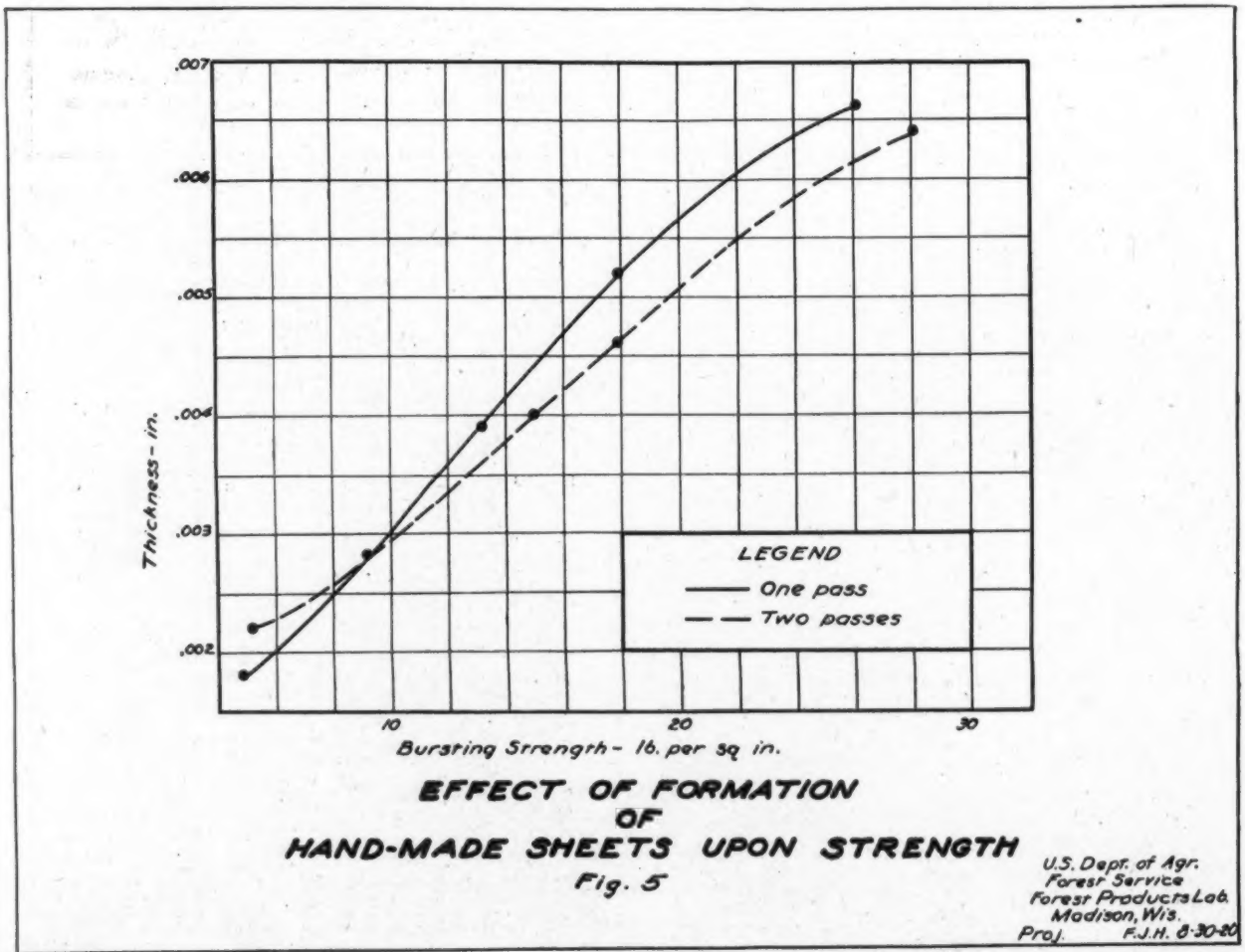
Personal Equation

The influence of the personal equation upon the sheet formation was next studied. Six of the laboratory force made hand sheets, each person making the sheet in his own way with no attempt to keep conditions constant. The different operators are represented by letters, and the results are shown in Table 1. Take the samples, C and C-1, made by a paper maker of wide experience, for the first comparison. The fibre ratios are 2.788:1 and 3.001:1; or, the sheets are 35.9 and 33.3 per cent perfect, that is, C is 7.8 per cent improvement over C-1. In the same way consider the two extremes, those sheets made by B and D which are 32.4 and 36 per cent perfect, respectively. Here D shows a 10 per cent improvement over B. These few experiments have only supported the original belief that no two persons and not even the same person can make sheets that will test alike.

Use of Different Consistencies of Stock

The effect of varying the amount of stock to the volume of water was also investigated. The granite stock was used for this experiment. The volume of water was kept constant at approximately 15 liters, but the weight of stock was varied from .025 to .2 per cent on the basis of the volume of water. All samples were made by the same operator and in the usual manner. The paper was finished, as stated before, and it must be remembered, especially in considering the thickness of the sheet, that it is comparable only to a sheet made in a like manner and not to a sheet made on a machine and which has passed through the regular press rolls. The samples were tested for bursting strength under constant conditions of humidity, and the results are tabulated in Table 1 under A-15 to A-27, inclusive. There were three different samples made for each percentage of stock; that is, there was one sheet made with one pass, one with two, and one with three. The results from the strength tests of the above have been plotted in figures 4, 5, and 6. In figure 4, thickness in inches has been plotted against bursting strength in pounds per square inch, each curve representing a constant con-

(*Continued on page* 162)



EFFECT OF FORMATION OF HAND-MADE SHEETS UPON STRENGTH

Fig. 5

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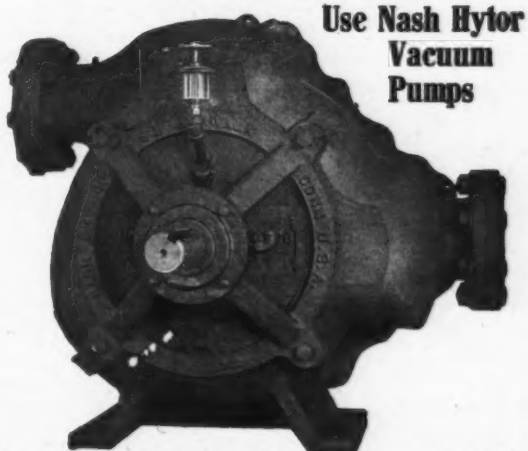

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PULP EVALUATION AS AFFECTED BY THE FIBRE

(*Continued from page* 160)

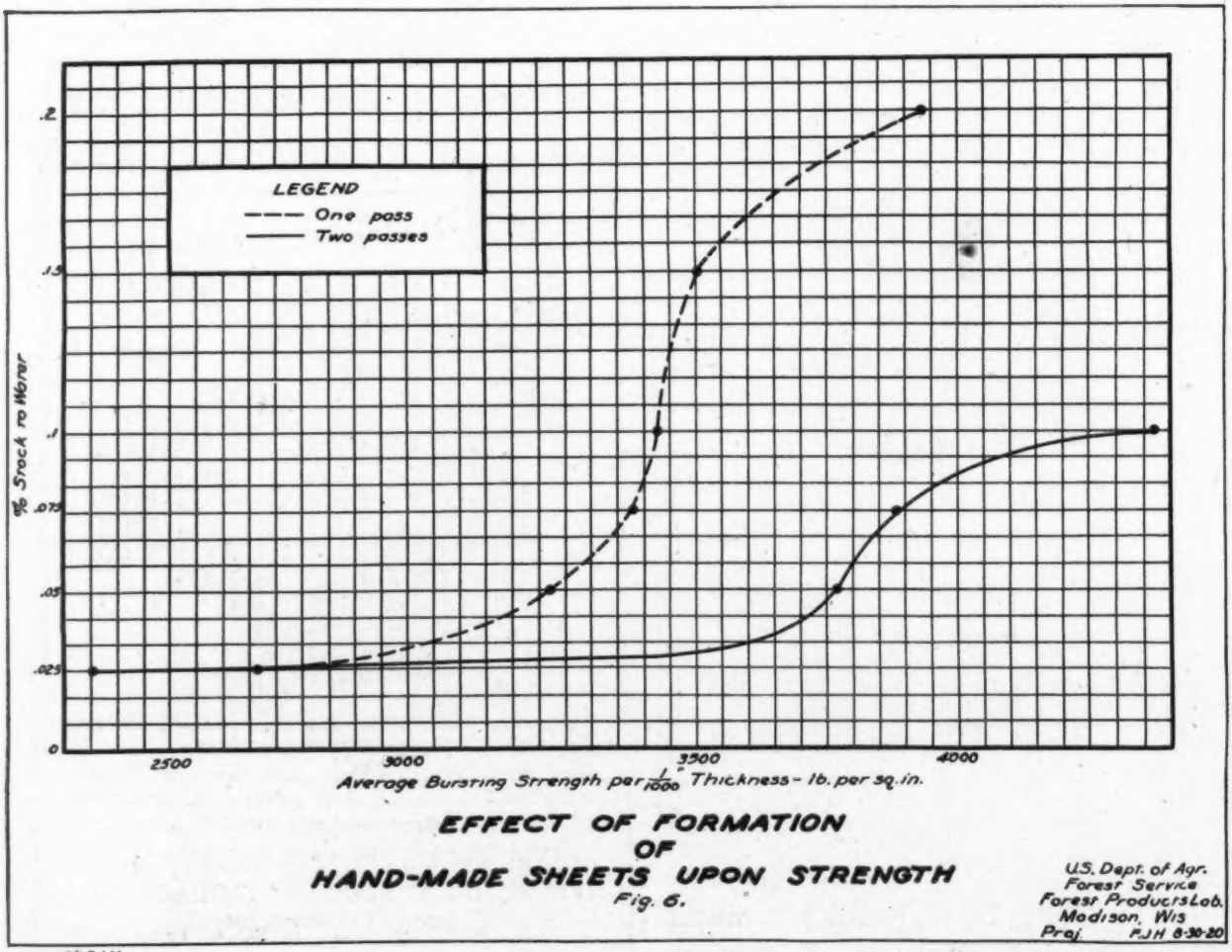
sistency, and the three points represent one, two, and three passes, respectively. In figure 5, thickness in inches has been plotted against bursting strength in pounds per square inch. Curve A represents the results from one pass with varying consistencies, and curve B two passes with varying consistencies. In figure 6, stock consistency has been plotted against average bursting strength per 1/10,000 inch of thickness in pounds per square inch. Curve A represents the results from one pass and B from two passes. The results seem to indicate that a sheet made from a stock of .075 and .15 per cent consistency and with two to three dips is the most desirable.

Discussion

There is very little to be said in favor of the present method of making hand sheets for testing purposes. It is quite apparent that it is impossible to obtain a uniform sheet in this manner. If this method is to be used, however, it is well to consider fully all the factors. The pulp must always be uniformly prepared. The consistency of the pulp and the number of passes required for a sheet depends upon the thickness desired, and standards for these two factors should be adopted in order to obtain comparable results. It is quite evident that two passes will make a better sheet than one pass, for there seems to be some felting action between the fibres with the second pass, which gives a more even formation. The above results also show that with certain variations in handling the mold, the formation may be somewhat controlled, but none of these modifications except as in A-29 can be recommended, because the final sheet was in no case as good as one made on a machine. If any suggestions for the preparation of the hand-mold sheet are to be made, it is strongly recommended that the sheets be formed in a manner similar to that described under A-29. Here conditions are at least approaching the ideal. While the danger of a machine direction from currents is not entirely eliminated, still it has been reduced almost to a minimum, and the chance of obtaining an even sheet so far as thickness is concerned is much better. Of course, it is impossible to make more than one pass to a sheet by this method, and without doubt the consistency of the stock would be a factor worthy of serious consideration should the method be used.

The method which suggests itself from a consideration of the above results, and is recommended for making sample sheets for testing purposes, is the formation of the sheet on the suction mold. It requires no great skill or training to operate the apparatus, and a number of samples can be turned out in a short time. The inaccuracies arising from personal equation, machine direction, and uneven sheets are reduced almost to a minimum; the only

(*Continued on page* 174)



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New York Market Review

Office of the PAPER TRADE JOURNAL,
WEDNESDAY, November 17, 1920.

In spite of the fact that there has been little or no improvement in general market conditions throughout the trade during the past week everyone remains quite optimistic and from all quarters come prophecies of a big business by the first of the year. No one believes that prices will ever reach the abnormal level again at which they were last year, but on the other hand it is thought that many of the grades which have been falling off to such a pronounced degree during the last month or six weeks will recover somewhat.

The big question is now one of endurance. Can the buyers hold off until manufacturers lower prices or will they be forced by sheer necessity to accept the manufacturers' terms. All of the mill men claim that they cannot cut their prices yet. The cost of production is just about as high as ever, although there is every indication that raw materials will soon be cheaper and is now in fact. However, the recent reductions in raw material have been made too recently to affect the manufacturers as yet, most of whom had large stocks on hand for which they paid high prices and which they are now rapidly using up. When they come into the market again and buy the cheaper material they may be able to cut their own prices, but before this occurs they all seem to think that prices should stay up.

Board has proved an exception to this rule. This market has been so abnormal in regard to price that it was top heavy and thus it took only a little push to start it rolling down hill. This came a month ago and it is still rolling, but in spite of sweeping reductions the manufacturers do not report that any great flood of orders are coming in, to tell the truth the demand is practically nil. Buying has held off so long now that things are bound to begin to happen soon, because it is only reasonable to conjecture that consumers will have to stock up pretty soon and when they do begin prices will come back a little.

A fairly good business has been done in news print although the price has been going down very slightly. This was to be expected, however, since ground wood had fallen off its perch. Rumors are flying about to the affect that one of the largest manufacturers of this stock is planning to set a price of 7 cents a pound for contracts beginning January 1. Publishers hoped that by holding off their buying as much as possible and buying imported paper they would be able to force the spot price down below this, but the large surplus supply of news print which was supposed to be knocking about Europe is evidently still pursuing its peregrinations, at least no one has been able to find it so elusive has it proved. It is true that some has been imported, but not enough to amount to the proverbial drop in the trite bucket. Thus that little bubble has burst and now it is to be hoped that buyers and manufacturers will settle down to a sane consideration of their mutual problem.

Book and tissue paper appear to be a little better this week. Possibly this is due to the approach of the holiday season which always has a marked influence on tissue. There are no extra stocks on hand and jobbers are advising their customers to stock up now and get the advantage of the slightly lowered prices before the winter season when traffic conditions make delivery difficult.

Mechanical Pulp

Mechanical pulp has been falling off steadily and several times it has appeared as though it would not go down any further, but it has continued until now it really seems to have gone as far as it will. It is expected that the price will go up again during the winter though not so high as it has been.

Chemical Pulp

Chemical pulp has not changed much during the current week except for a further slight falling off in strong unbleached domestic sulphite and in mitscherlich. Dealers expect that the mills will be forced to begin to stock up again before winter conditions completely cut off any hope for further importation from Scandinavia.

Rags

The demand for rags is very dull now and there is no immediate hope for things livening up any before the first of the year. Importations are not nearly so heavy as they were and some of the grades are so low as to make it unprofitable for dealers to handle them.

Waste Paper

The waste paper market is almost at a standstill as a result of the slump in board more than anything else. It is difficult to qoote definite prices because there is so little buying.

Old Rope and Bagging

There is little action in the old rope and bagging market and things are on the whole very quiet. Things are expected to be better however in a short time for the mills are bound to begin to buy again.

Twine

A peculiar situation is reported in twine. Prices have been cut and a slow demand reported by a number of dealers while others have kept things at the same level and say that business is flourishing.

PAPER DEMAND IN TORONTO

(*Continued from page* 130)

returned from a business trip to Winnipeg and other points west.

The premises of Fred W. Halls Paper Company, Adelaide street west, Toronto, were flooded recently owing to the failure to put a cap on a water pipe and several thousand dollars damage was done to the stock.

The many friends of Col. Thomas Gibson, Toronto, vice-president of the Spanish River Paper Mills, and J. G. Gibson, secretary of the company, are extending sympathy in the death of their mother, Mrs. Joseph Gibson, of Ingersoll, Ont., who passed away recently as a result of a paralytic stroke.

R. A. McInnis, manager of the Abitibi Power and Paper Company, Iroquois Falls, Ont., has been appointed president of the Associated Boards of Trade of Northern Ontario, which body has appointed a representative committee to act with the Ontario government in an effort to protect the forests of the north against fires and to adopt more stringent safeguarding measures.

Among the recent callers on the trade in Toronto were W. E. Duncan of the Canadian Paper Export Association, Montreal, E. S. Crabtree of Montreal, representing the Bathurst Lumber Company, Bathurst, N. B., and D. H. Hudson of the Hudson Paper Company, Winnipeg.

J. F. McKay, for seventeen years business manager of the Toronto *Globe*, and a former president of the Canadian Press Association, has removed from Toronto to Ingersoll where he has been appointed vice-president and manager of the John Morrow Screw and Nut Company.

The Provincial Paper Mills Company, Toronto, have been successful in tendering for a timber berth of seventy square miles in West Hele township, which contains about seventy-five thousand cords of pulpwood which will be used in the sulphite plant of the company at Port Arthur, Ont.

A meeting of the representatives of the Canadian paper box industry and a conference with the board manufacturers was held recently in Montreal. Those who attended from Toronto were W. P. Bennett, past president of the Canadian Paper Box Manufacturers Association, G. Shaw of the Telfer Manufacturing Company, A. Jephcott of the Dominion Paper Box Company and A. Sproul of Collett & Sproul.

Market Quotations

Paper Company Securities

New York Stock Exchange closing quotations November 16, 1920:

Stocks.	BID	ASKED
American Writing Paper Company, pref.	41	42
International Paper Company, com.	56	56¼
International Paper Company, pref., stamped	71	72
Union Bag & Paper Corporation	76	79
United Paper Board	27	27

Because of the unusual conditions prevailing in the various markets quotations are more or less nominal.

Paper

F. o. b. Mill.

Bonds	19	@	66
Ledgers	18	@	48
Writing—			
Extra Superfine..	28	@	38
Superfine	22	@	26
Tub Sized	17	@	22
Engine Sized	15	@	22
News—f. o. b. Mill—			
Rolls, contact	6.00	@	7.35
Rolls, transit	9.00	@	10.00
Sheets	7.35	@	8.25
Side Runs	6.25	@	7.00
Book, Cased—f. o. b. N. Y.—			
S. & S. C.	14.00	@	17.00
M. F.	12.00	@	13.00
Coated and Enamel	16.00	@	18.00
Lithograph	17.50	@	20.00
Tissues—f. o. b. N. Y.—			
White, No. 1	1.80	@	2.00
White, No. 2	1.60	@	1.70
Manila No. 1	1.60	@	1.70
Kraft	2.00	@	2.25
Colored	2.00	@	3.50
Anti-Tarnish	2.25	@	3.50
Kraft—f. o. b. Mill—			
No. 1 Domestic	12.00	@	13.00
No. 2 Domestic	11.50	@	11.75
Imported	14.00	@	15.00
Screenings	7.00	@	8.00
Manila—			
No. 1 Jute	16.00	@	18.00
No. 2 Jute	11.00	@	12.00
No. 1 Wood	10.00	@	11.00
No. 2 Wood	9.00	@	10.00
Butchers	8.00	@	9.00
Fibre Papers—			
No. 1 Fibre	8.00	@	9.00
No. 2 Fibre	7.00	@	8.00
Common Bogus	6.00	@	7.00
Card Middles	5.50	@	6.00
Boards—per ton—			
News	75.00	@	85.00
Straw	105.00	@	110.00
Chip	65.00	@	75.00
Binders' Board	100.00	@	130.00
Sgl. Mla. Ld. Chip.	120.00	@	130.00
Wood Pulp	140.00	@	150.00
Container	100.00	@	110.00

Mechanical Pulp

(F. o. b. Pulp Mills.)

No. 1, f.o.b. Mill	110.00	@	115.00

Chemical Pulp

(Ex-Dock, New York.)

Sulphite (Foreign)—			
Bleached	12.00	@	14.00
Easy Bleaching	10.00	@	11.00
No. 1, unbl'ch'd.	9.00x	@	10.00
No. 2, unbl'ch'd.	8.50	@	9.00
Kraft (Foreign)	6.50	@	7.00
Sulphate—			
Bleached			nominal
(F. o. b. Pulp Mill.)			
Sulphite (Domestic)—			
Bleached	12.00	@	13.00
Strong Unbl'ch'd.	9.00	@	10.00
Easy Bleaching Sulphite	9.00	@	9.50
News Sulphite	8.00	@	8.50
Mitscherlich	9.50	@	10.00
Kraft (Domestic)	6.50	@	7.00
Soda Bleached			nominal

Domestic Rags

New

Prices to Mill, F. o. b. N. Y.

Shirt Cuttings—			
New White, No. 1	24.00	@	25.00
New White, No. 2	12.25	@	12.75
Silesias, No. 1	12.00	@	12.50
New Unbleached	16.50	@	17.00
Washables	11.50	@	12.00
Fancy	13.00	@	13.50
Cottons — according to grades—			
Blue Overall	11.50	@	12.00
New Blue	9.50	@	10.00
New Black Soft	7.50	@	8.00
New Light Seconds	6.75	@	7.00
Khaki Cuttings	7.50	@	8.00
Corduroy	7.25	@	7.75
New Canvas	14.00	@	14.50
New Black Mixed Old	5.00	@	5.25
White, No. 1—			
Repacked	12.00	@	12.50
Miscellaneous	10.50	@	11.00
White, No. 2—			
Repacked	6.25	@	6.75
Miscellaneous	5.00	@	5.50
St. Soiled White	3.90	@	4.10
Thirds and Blues—			
Repacked	4.00	@	4.25
Miscellaneous	2.90	@	3.15
Black Stockings	3.75	@	4.00
Cloth Strippings	1.90	@	2.00
No. 1	2.00	@	2.15
No. 2	1.20	@	1.30
No. 3	1.10	@	1.25
No. 4	1.10	@	1.25
No. 5A	2.20	@	2.30
B	2.00	@	2.20
C	.60	@	.70

Foreign Rags

New Light Silesias	11.00	@	12.50
Light Flannelettes	12.00	@	13.00
Unbleached Cottons	14.00	@	15.00
New White Cuttings	18.00	@	20.00
New Light Oxfords			nominal
New Light Prints	11.00	@	12.00
New Mixed Cuttings	7.00	@	8.00
New Dark Cuttings	4.50	@	4.75
No. 1 White Linens			nominal
No. 2 White Linens			nominal
No. 3 White Linens	10.00	@	12.00
No. 4 White Linens	8.00	@	10.00
Old Extra Light Prints	4.75	@	5.00
Ord. Light Prints	4.75	@	5.50
Med. Light Prints	3.00	@	3.25
Dutch Blue Cottons	4.50	@	4.75
Ger. Blue Cottons			nominal
Ger. Blue Linens			nominal
Checks and Blue			nominal
Dark Cottons	2.40	@	2.60
Shoppery	2.12	@	2.60
French Blues			nominal

Bagging

Prices to Mill F. o. b. N. Y.

Gunny No. 1—			
Foreign	2.50	@	2.70
Domestic	2.60	@	2.75
Wool Tares, light	3.15	@	3.30
Wool Tares, heavy	3.00	@	3.50
Bright Bagging	3.00	@	3.25
No. 1 Scrap	2.75	@	2.90
Sound Bagging	2.75	@	3.00
Manila Rope—			
Foreign	6.25	@	6.50
Domestic	6.00	@	6.50
New Bu. Cut	5.25	@	5.50
Hessian Jute Threads—			
Foreign	7.00	@	7.50
Domestic	6.50	@	7.00
Mixed Strings	2.25	@	2.75

Twines

(F. o. b. Mill)

Cotton—			
No. 1	50	@	60
No. 2	60	@	70
No. 3	40	@	50
India, No. 6 basis—			
Light	20	@	30
Dark	26	@	27
B. C., 18 Basis	42	@	45
A. B. Italian, 18 Basis	$1.00	@	—
Finished Jute—			
Light, 18 basis	26	@	28
Dark, 18 basis	40	@	41
Jute Wrapping, 2-6 Ply—			
Extra No. 1	33	@	34
No. 1	33	@	34
No. 2	24	@	27
Tube Rope—			
5-ply and larger	20	@	21
Fine Tube Yarn—			
5-ply and larger	35	@	38
4-ply	36	@	38
3-ply	37	@	39
Unfinished India—			
No. 2 (3-ply and larger)	25	@	26
Paper Makers Twine Balls	17	@	18
Box Twine, 2-4 ply	20	@	21
Jute Rope	20	@	21
Amer. Hemp. 6	37	@	39
Sisal Hay Rope—			
No. 1 Basis	20	@	22
No. 2 Basis	18.50	@	20
Sisal Lath Yarn—			
No. 1	19.25	@	19.75
No. 2	17.50	@	19.50
Manila Rope	27	@	28

Old Waste Papers

(F. o. b. New York.)

Shavings—			
Hard White, No. 1	8.50	@	8.75
Hard White, No. 2	7.25	@	7.50
Soft White, No. 1	7.25	@	7.50
Colored, No. 1	3.00	@	3.25
Flat Stock—			
Stitchless	2.75	@	3.00
Over Issue Mag.	2.25	@	3.00
Solid Flat Book	1.75	@	2.60
Crumpled, No. 1	1.40	@	1.90
Solid Book Ledger	4.25	@	4.50
Ledger Stock	3.90	@	4.12
No. 1 White New	4.50	@	5.00
New B. B. Chips	.70	@	.80
Manilas—			
New Env. Cut	5.25	@	5.50
New Cut. No. 1	4.50	@	4.75
Extra No. 1 Old	1.75	@	1.80
Print	1.00	@	1.25
Container Board	.70	@	.80
Bogus Wrappers	1.00	@	1.25
Old Krafts, machine compressed Bales	4.25	@	4.50
News—			
Strictly Overissue	1.40	@	1.60
Strictly Folded	1.00	@	1.20
No. 1 Mixed Paper	.60	@	.70
Common Paper	.40	@	.50

CHICAGO

[FROM OUR REGULAR CORRESPONDENT.]

Paper

F. o. b. Mill.

All Rag Bond	45	@	—
No. 1 Rag Bond	30	@	40
No. 2 Rag Bond	26	@	38
Water Marked Sulphite	21	@	23
Sulphite Bond	19	@	21
Sulphite Ledger	22	@	25
Superfine Writing	28	@	35
No. 1 Fine Writing	26	@	33
No. 2 Fine Writing	24	@	31
No. 3 Fine Writing	20	@	22
No. 1 M. F. Book	15	@	16
No. 1 S. & S. C. Book	17	@	18
Coated Book	20	@	24
Coated Label	19	@	24
News—Rolls mill	11	@	11½
News—Sheets mill	12	@	12½
No. 1 Manila	11	@	11½
No. 1 Fibre	9½	@	10
No. 2 Manila	—	@	—
Butchers' Manila	—	@	—
No. 1 Kraft	13	@	13½
No. 2 Kraft	11½	@	12
Wood Tag Board	12	@	12½
Screenings	8½	@	9

Board being sold at price prevailing at time of shipment.

Boards, per ton—			
Plain Chip	—	@	—
Solid News	—	@	—
Manila Lined Chip	—	@	—
Container liner 85 85 Test	—	@	—
100 Test	—	@	—
Solid Wood Pulp	—	@	—
Straw Board	—	@	—
Filled Pulp Board	—	@	—

Old Papers

Shavings—			
No. 1 Hard White	7.00	@	8.00
No. 1 Soft Shav.	6.00	@	7.50
No. 1 Mixed	2.50	@	3.50
No. 2 Mixed	2.25	@	2.50
White Envel. Cutting	7.25	@	8.00
Ledgers and Writings	3.50	@	4.00
Solid Books	2.25	@	3.00
No. 1 Books, light	2.00	@	3.00
Blanks	4.50	@	5.00
Ex. No. 1 Manila	4.50	@	6.00
Manila Envelope Cuttings	4.75	@	—
No. 1 Manilas	1.75	@	—
Folded News (over issue)	1.50	@	2.50
Old Newspapers	1.25	@	2.00
Mixed Papers	1.05	@	1.75
Straw Clippings	1.25	@	2.50
Binders' Clippings	1.10	@	1.75
Kraft	4.50	@	6.25
New Craft Cuts	4.75	@	—
Roofing Stock, f.o.b. Chicago, Net Cash—			
No. 1	26.00	@	—
No. 2	24.00	@	—
No. 3	22.00	@	—
No. 4	22.00	@	—

PHILADELPHIA

[FROM OUR REGULAR CORRESPONDENT.]

Paper

Bonds	.20	@	.72
Ledgers	.23	@	.52
Writings—			
Superfine	.30	@	.50
Extra fine	.55	@	—
Fine	.24	@	.30
Fine, No. 2	.38	@	—
Fine, No. 3	.20	@	—
Book, M. F.	.18	@	.22
Book, S. S. & C.	.18¼	@	.22½
Book, Coated	.23½	@	.25½
Coated Lithograph	.23½	@	.26
Label	.23½	@	.26
News	.13	@	.15
No. 1 Jute Manila	.24	@	—
Manila Sul., No. 1	.15	@	—
Manila No. 2	.14	@	—
Common Bogus	.08½	@	—
Straw Board	1.05	@	1.10
News Board	.65	@	.90
Chip Board	.50	@	.60
Wood Pulp Board	.50	@	.65

(Carload Lots.)

Binders Boards—			
Per ton	.95	@	1.25
Carload lots	.90	@	1.20
Tarred Felts—			
Regular	1.00	@	1.05
Slaters'	1.03	@	1.07
Best Tarred, 1-ply (per roll)	1.50	@	1.60
Best Tarred, 2-ply (per roll)	1.65	@	1.70
Best Tarred, 3-ply	2.15	@	2.20

Bagging

F. o. b. Phila.

Gunny No. 1—			
Foreign	3.50	@	3.75
Domestic	3.50	@	3.75
Manila Rope	8.00	@	8.25
Sisal Rope	2.50	@	2.75
Mixed Rope	3.00	@	3.25
Scrap Burlaps	3.00	@	3.25
Wool Tares, heavy	5.20	@	5.50
Mixed Strings	3.00	@	3.25
No. 1, New Lt. Burlap	10.50	@	12.00
New Burlap Cuttings	4.00	@	4.25

Old Papers

F. o. b. Phila.

Shavings—			
No. 1, Hard White	8.50	@	8.75
No. 2, Hard White	7.50	@	7.75

(Continued on page 168)

Imports and Exports of Paper and Paper Stock

NEW YORK, BOSTON, PHILADELPHIA AND OTHER PORTS

NEW YORK IMPORTS

WEEK ENDING NOVEMBER 13, 1920.

SUMMARY.

Cigarette paper .....66 cs.
Printing paper .....491 cs.
Print paper .....1,461 rolls
News print .....2,110 rolls
Wall paper .....4 cs.
Paper hangings.....14 cs., 16 pkgs., 9 bls.
Colored paper .....16 cs.
Transparent paper .....188 pkgs.
Surface coated paper.....308 cs.
Writing paper .....6 cs.
Tracing paper .....9 cs.
Packing paper.....166 bls., 56 rolls, 35 cs.
Wood pulp paper.....3,600 pkgs.
Miscellaneous paper....199 cs., 4,049 rolls, 316 bls.

CIGARETTE PAPER.

The Surbrug Company, La Lorraine, Havre, 10 cs.
American Tobacco Company, by same, 56 cs.

PRINTING PAPER.

B. F. Drakenfeld & Co., Baltic, Liverpool, 35 cs.
J. L. N. Smythe Company, Noordam, Rotterdam, 25 cs.
J. I. N. Smythe Company, Beukelsdyk, Rotterdam, 247 cs.
Guaranty Trust Company, by same, 79 cs.
Globe Shipping Company, Borga, Hamburg, 105 cs.

PRINT PAPER.

American Express Company, Schoharie, Hamburg, 1,461 rolls.

NEWS PRINT PAPER.

W. Schall & Co., Hellig Olav, Copenhagen, 693 rolls.
Columbia Trust Company, Beukelsdyk, Rotterdam, 1,417 rolls.

WALL PAPER.

F. J. Emmerich, La Lorraine, Havre, 4 cs.

PAPER HANGINGS.

A. E. Bulkley, Rimouski, Liverpool, 1 cs.
W. H. S. Lloyd & Co., Lancastrian, London, 9 cs.
W. H. S. Lloyd & Co., Wauconda, London, 16 pkgs.
A. C. Dodman, Jr., Inc., Baltic, Liverpool, 9 bls.

COLORED PAPER.

Baldwin Universal Consol. Company, F. J. Luckenbach, Rotterdam, 16 cs.

TRANSPARENT PAPER.

H. Lindenmeyr & Son, Noordam, Rotterdam, 188 pkgs.

SURFACE COATED PAPER.

L. A. Consmiller, Noordam, Rotterdam, 62 cs.
Paul Puttmann, Ptatgonier, Antwerp, 240 ss.
C. B. Richard & Co., Bergensfjord, Kristiania, 6 cs.

WRITING PAPER.

Van Oppen & Co., Lancastrian, London, 6 cs.

TRACING PAPER.

Meadows, Wye & Co., Wauconda, London, 4 cs.
M. Winter, Borga, Hamburg, 5 cs.

PACKING PAPER.

Birn & Wachenheim, Noordam, Rotterdam, 64 bls., 56 rolls, 35 cs.
Chemical National Bank, Borga, Hamburg, 102 bls.

WOOD PULP PAPER.

Foreign Trade Banking Corporation, Borga, Hamburg, 3,600 pkgs.

PAPER.

H. Kayser et fils, La Lorraine, Havre, 16 cs.
D. J. Cocuca & Co., by same, 3 cs.
Irving National Bank, Schoharie, Hamburg, 5 cs.
Reeve, Angel & Co., Wauconda, London, 1 cs.
Hart Trading Company, Borga, Hamburg, 2,013 rolls.
Philadelphia National Bank, by same, 51 cs.
National City Bank, Patagonier, Antwerp, 316 bls.
American Express Company, by same, 4 cs.
Habirshaw Elec. Cable Company, Vin. Bridge, Gothenburg, 1,842 rolls.
11 Progresso Italo Americano, by same, 194 rolls.
Japan Paper Company, San Gennaro, Genoa, 119 cs.

IN TRANSIT TO AUSTIN, ILL.

Myercord Company, Baltic, Liverpool, 11 cs. printing paper.

TO CHICAGO.

E. H. Sergeant & Co., Drottinghohn, Gothenburg, 2 cs. filter paper.

RAGS, BAGGINGS, ETC.

American Express Company, Rimouski, Liverpool, 20 bls. rags.
Castle, Gottheil & Overton, Patagonier, Antwerp, 2 bls. bagging.
P. Berlowitz, by same, 210 bls. rags.
Bank of United States, by same, 47 bls. rags.
Main Paperstock Company, by same, 52 bls. rags.
Equitable Trust Company, by same, 180 bls. rags.
Mechanics & Metals National Bank, by same, 80 bls. rags.
E. J. Keller Company, by same, 459 bls. rags.
Castle, Gottheil & Overton, Pontia, Belfast, 34 bls. rags, 91 bls. waste paper.
Castle, Gottheil & Overton, Wauconda, London, 137 bls. waste paper.
Castle, Gottheil & Overton, La Perouse, Havre, 517 bls. rags.
Castle, Gottheil & Overton, Patagonier, Antwerp, 569 bls. rags.
Castle, Gottheil & Overton, Beukelsdyk, Rotterdam, 165 bls. rags.
Castle, Gottheil & Overton, Hellig Olav, Copenhagen, 259 bls. rags.
Castle, Gottheil & Overton, Noordam, Rotterdam, 200 bls. rags.
Guaranty Trust Company, Vitellia, Glasgow, 97 bls. paper stock.
Baeder, Adamson & Co., Baltic, Liverpool, 134 bags hide cuttings.
Chemical National Bank, H. Olav, Copenhagen, 98 bls. rags.
E. J. Keller Company, Beukelsdyk, Rotterdam, 315 bls. paper stock, 156 bls. shoppery.
Main Paperstock Company, by same, 180 bls. rags, 91 bls. cottons.
Wilkinson Brothers & Co., by same, 102 bls. cottons, 175 bls. paperstock.
M. Frank, by same, 59 bls. new cuttings.
Castle, Gotthiel & Overton, by same, 40 bls. old wipers.
R. F. Downing & Co., by same, 200 bls. rags, 21 bls. new cuttings.
D. Van de Berg, by same, 48 bls. rags.
Salomon Brothers & Co., by same, 42 bls. rags.

OLD ROPE.

M. O'Meara Company, H. Olav, Copenhagen, 121 coils.

WOOD PULP.

J. Andersen & Co., Bergensfjord, Kristiania, 3,000 bls., 508 tons bleached sulphite.
F. M. Sergeant & Co., by same, 160 bls., 20 tons dry chemical pulp.
American Wood Pulp Corporation, by same, 300 bls., 50 tons kraft soda pulp.
American Wood Pulp Corporation, Drottningholm, Gothenburg, 508 bls. kraft soda pulp.
E. M. Sergeant & Co., by same, 420 bls. dry soda.
J. F. Patton & Co., Inc., by same, 4,900 bls. wet mechanical pulp.
Corin Brothers, Inc., Vin. Bridge, Gothenburg, 875 bls., 177 tons dry sulphite pulp.
W. Schall & Co., by same, 300 bls., 50 tons dry kraft pulp.
Scandinavian-American Trading Company, by same, 475 bls., 95 tons pulp.
E. M. Sergeant & Co., by same, 175 bls., 25 tons sulphate pulp.
M. Gottesman & Co., by same, 1,000 bls., 203 tons dry chemical pulp.
J. Andersen & Co., Belvedere, Trieste, 130 bls. cellulose.

* Correction: The item last week crediting the Scandinavian-American Trading Company with importing 10,220 bbls. of moist mechanical pulp was in error.

PHILADELPHIA IMPORTS

WEEK ENDING NOVEMBER 13, 1920.

Castle, Gottheil & Overton, Celaeno, Rotterdam, 152 bls. rags.
Castle, Gottheil & Overton, Casper, Rouen, 647 bls. rags.

BOSTON IMPORTS

WEEK ENDING NOVEMBER 6, 1920.

PAPER STOCK.

Edwin Butterworth & Co., Ernemore, Liverpool, 64 bls. bagging.
Train, Smith Company, Winifredian, Liverpool, 38 bls. waste paper.
International Purchasing Company, by same, 94 coils manila rope.
Edwin Butterworth & Co., by same, 288 bls. paper stock.

HIDE CUTTINGS.

E. T. Russ Company, Winifredian, Liverpool, 39 bags.

NATIONAL FOREST POLICY

(*Continued from page* 126)

hand, there isn't any reason why the United States should not be self-reliant in the great essential of lumber for construction purposes. It is perfectly practicable and feasible to provide for a new growth of timber and an imperative duty to improve our forest protection. I can think of no forward look, in relation to the good fortunes of America which does not contemplate a forest policy which will assure us the essential in the lumber line for all our constructive activities.

Substitutes and supersedure will not alone relieve the threatening situation. As our civilization advances we shall build less wastefully and temporarily than characterize the construction of developing period. This is the story of human progress. Permanent housing more dependably constructed always follows the temporary effects incident to development but no change of policy will ever eliminate our lumber needs.

"I have sought to emphasize the thought of reforestation because I think it is highly essential for the United States of America to ever be thinking of self-reliance. We are so blessed with God's bounty, so varied in our productivity and so boundless in our resources that the combination of American genius and a committal to conservation and cultivation will leave us independent of the resources or the activities of the remainder of the world."

To Build Box Factory in New Orleans

NEW ORLEANS, La., November 15, 1920.—Another new factory is to be erected in this city as a result of the promising market for corrugated paper-fibre boxes and the perfection of producing machinery.

The Union Paper Products Company will invest $300,000 in the enterprise, and has bought a site and let contracts for building a steel and cement factory. The plant will employ seventy-two people at the start, without counting the office force.

The Home of Quality

FACTORY
132ND TO 133RD ST & BROOK AVE

PAPER BAGS

Sacks and Specialties

ESTABLISHED 1901

SCHORSCH & CO.

Manufacturers

500 East 133d Street : New York

on a Paper Bag vouches for its Good Quality

Guaranteed Flat Gummed Paper

GUARANTEED
FLAT FLAT
GUMMED PAPER

The Leader for Seventy-five Years

IDEAL COATED PAPER CO.

Mills and Main Office, BROOKFIELD, MASS.

NEW YORK CHICAGO CINCINNATI

Missisquoi Pulp and Paper Company

SHELDON SPRINGS VERMONT

White and Tinted Bristols — White Blanks — Index Bristol and Specialties in Card Boards.

We announce the completion at Cincinnati, Ohio, of the most modern plant, built and operated by practical experts of the highest standing in the manufacture of Silicate of Soda.

It is our purpose to merit your business on the basis of standard quality and dependable service.

Inquiries are solicited for spot and contract deliveries.

THE STANDARD SILICATE COMPANY

MANUFACTURERS OF

SILICATE OF SODA

CINCINNATI, OHIO.

Miscellaneous Markets

Office of the PAPER TRADE JOURNAL,
WEDNESDAY, November 17, 1920.

With prices on the decline in almost everything the buyers of chemicals seem to believe that these too are going to drop. Whether this assumption is justifiable or not is debatable. The manufacturers claim that the reason most of the prices are going down is because in most lines there has been considerable space between the cost of production and the selling price. This has not been true throughout the chemical market with the exception of a few isolated cases. Manufacturers have not been making excessive profits and thus there is very little room for any radical cut in prices which would still allow a legitimate profit to manufacturers. Of course, if buying holds off too long, the jobbers, who have supplies on hand, will become frightened and unload at a sacrifice which would be liable to precipitate a dangerous situation. It is an old story to point out that freight, cooperage, raw materials and labor have all increased manifold since those halcyon days before the war, thus necessitating high prices. The chemical manufacturers have not taken advantage of these conditions to profiteer and thus they cannot in justice to themselves make the big cuts that the buyers expect until the cost of production is lowered.

ALUM.—The supply of alum is about the same as it was last week, but owing to a lack of demand there is a good deal more on the open market than there has been. Prices are holding firm at 5 cents a pound for the lump, 5.26 cents on the ground and 6 cents on the powdered.

BLEACHING POWDER.—While bleaching powder has been scarce it is now easy to find it in the spot market. Buying is almost at a standstill, but manufacturers do not feel that they can drop the price with the cost of steel drums and hardwood barrels up as high as they are still. It is now about 6.50 cents per pound.

CASEIN.—Like the rest of the market, casein is dull, but the supply is no larger than it was before, although it is easier to get than it was early in the fall. This can be accounted for by an improvement in shipping conditions and by the falling off in buying. The price is unchanged at 15 or 16 cents per pound.

CAUSTIC SODA.—A short time ago the diverting of large orders intended for shipment to Japan to the New York spot market, sent this commodity down a little. Now this material has been largely taken up and caustic has gained about a quarter or half a cent per pound in price. The demand is not improved a great deal, but things are looking a little better. It is around 4.30 cents per pound.

CHINA CLAY.—While business in china clay is not very speedy manufacturers are reporting that they still have a good business on contract so that they are not forced to sit in idleness. There is not a great deal doing in the open market and jobbers are suffering a little. Domestic is around 10 cents in the unwashed grade, 13 cents in the washed and 16 cents in the imported.

ROSIN.—Rosin is still pretty slow as it has been for over a month now. In spite of the cut in prices the buyers refuse to be wheedled into signing up for any large orders. It is now around $11 per ton in grades E, F and G.

SATIN WHITE.—Satin white is a little better than the rest of the chemical market, but it is by no means rushing as far as the open market is concerned. Buying is somewhat slow, but manufacturers are optimistic. The price is about 2.25 cents per pound.

SULPHATE OF ALUMINA.—This product is not much more lively than the rest of the commodities, but the price is still about 4.50 to 5 cents for iron free and 3 to 3.50 for commercial.

STARCH.—There is little to report in starch except that prices are still low and there is at present little likelihood of their reaching the level that they were early in the season.

Market Quotations

(*Continued from page* 165)

No. 1 Soft White	7.50	@	7.75
No. 2 Soft White	6.00	@	6.50
No. 1 Mixed	3.50	@	4.00
No. 2 Mixed	2.75	@	3.00
Solid Ledger Stock	4.50	@	4.60
Writing Paper	4.00	@	4.25
No. 1 Books, heavy	3.60	@	3.75
No. 2 Books, light	2.50	@	2.75
No. 1 New Manila	6.50	@	6.75
No. 1 Old Manila	4.00	@	4.25
Container Manila	3.25	@	3.50
Old Kraft	6.25	@	6.50
Overissue News	1.50	@	1.75
Old Newspaper	1.00	@	1.25
No. 1 Mixed Paper	.75	@	1.00
Common Paper	.75	@	1.00
Straw Board, Chip	1.75	@	2.00
Binders' Bd. Chip	1.75	@	2.00

Domestic Rags—New
Price to Mill, f. o. b. Phila.

Shirt Cuttings—			
New White, No. 1	.19	@	.21
New White, No. 2	.12	@	.12½
Silesias, No. 1	12.50	@	13.00
New unbleached	15.75	@	16.50
Washables	10.75	@	11.00
Fancy	12.75	@	13.50
Cottons—according to grades—			
Blue Overall	11.00	@	11.75
New Blue	8.00	@	8.50
New Black Soft	6.75	@	7.00
New Light Seconds	6.00	@	6.50
Khaki Cuttings	7.00	@	7.25
Corduroy	6.50	@	6.75
New Canvas	13.00	@	13.50
New Black Mixed	5.75	@	6.25
Old			
White, No. 1—			
Repacked	14.50	@	15.50
Miscellaneous	11.50	@	12.50
White, No. 2—			
Repacked	7.00	@	7.50
Miscellaneous	6.00	@	6.50
Thirds and Blues—			
Repacked	4.75	@	5.25
Miscellaneous	4.25	@	4.50
Black stockings	4.50	@	4.75
Roofing Stock—			
No. 1	2.90	@	3.20
No. 2	2.50	@	2.60
No. 3	1.70	@	2.00
No. 4	2.40	@	2.50
No. 5A	2.25	@	2.50
B	2.00	@	2.25
C	1.25	@	1.50

BOSTON

[FROM OUR REGULAR CORRESPONDENT.]

Paper

Bonds	.20½	@	.72
Ledgers	.20½	@	.57
Writings—			
Superfine	.20½	@	—
Fine	.20	@	—
Books, S. & S. C.	.15	@	.24¼
Book, M. F.	.16	@	.18
Book, Coated	.21	@	.28
Label	.25½	@	—
New Sheets	.12	@	—
News, Rolls	.08	@	.08½
Manilas—			
No. 1 Manila	.08	@	.09¼
No. 1 Fibre	.09	@	.09½
No. 1 Jute	.14	@	.14½
Kraft Wrapping	.12	@	.13
Common Bogus	.04½	@	.05

Boards

Per ton f. o. b. mill.

Chip	65.00	@	—
News Not Lined	67.50	@	—
Wood Not Lined	90.00	@	—
Filled News Board	70.00	@	—
Solid News Board	75.00	@	—
S. Manl. Chip	120.00	@	—
Pat Coated	160.00	@	—

Old Papers

Shavings—			
No. 1 Hard White	8.00	@	8.50
No. 1 Soft White	7.50	@	8.00
No. 1 Mixed	4.00	@	4.50
Ledger and Writings	4.50	@	5.00
Solid Books	4.75	@	—
Blanks	5.00	@	5.50
No. 2 Books, light	2.50	@	3.00
No. 1 Manila	4.25	@	4.50
Folded News (overissues)	2.25	@	2.50
Old Newspapers	1.50	@	1.75
Mixed Paper	1.25	@	1.50
Gunny Bagging	4.00	@	4.50
Manila Rope	5.50	@	5.75

TORONTO

[FROM OUR REGULAR CORRESPONDENT.]

Paper

(Mill Prices to Jobbers)

Bond—			
Sulphite	20½	@	—
Light tinted	21½	@	—
Dark tinted	22½	@	—
Ledgers	20	@	—
Writing	15	@	—
News, f. o. b. Mills—			
Rolls (carloads)	5.50	@	6.00
Sheets (2 tons or over)	6.00	@	6.50
Sheets (less than 2 tons)	6.50	@	6.75
Book—			
No. 1 M. F. (carloads)	15.50	@	—
No. 2 M. F. (carloads)	15.00	@	—
No. 3 M. F. (carloads)	14.75	@	—
No. 1 S. C. (carloads)	16.00	@	—
No. 2 S. C. (carloads)	15.50	@	—
No. 1 Coated and litho.	20.50	@	—
No. 2 Coated and litho.	19.50	@	—
No. 3 Coated and litho.	18.75	@	—
Coated and litho., colored	20.75	@	—
Wrapping—			
Grey	10.75	@	—
"B" Manila	11.00	@	—
No. 1 Manila	12.50	@	—
Fibre	12.00	@	—
Kraft, M. F. or M. G.	13.00	@	—

Pulp

(F. o. b. Mill)

Ground Wood	120.00	@	125.00
Sulphite, easy bleaching	165.00	@	170.00
Sulphite, news grade	155.00	@	160.00
Sulphite, bleached	195.00	@	205.00
Sulphate	140.00	@	150.00

Old Waste Papers

(In carload lots, f. o. b. Toronto)

Shavings—			
White Env. Cut	7.50	@	—
Soft White Book Shavings	7.25	@	—
White Bl'k News	6.00	@	—
Book and Ledger—			
Flat Magazine and Book Stock (old)	2.75	@	—
Light and Crumpled Book Stock	2.25	@	—
Ledgers and Writings	3.75	@	—
Solid Ledgers	3.75	@	—
Manilas—			
New Manila Cut	6.00	@	—
Printed Manilas	3.00	@	—
Kraft	5.75	@	—
News and Scrap—			
Strictly Overissue	2.75	@	—
Folded News	2.20	@	—
No. 1 Mixed Papers	1.75	@	—

Domestic Rags—
Price to mills, f.o.b. Toronto. Per lb.

No. 1 White shirt cuttings	.23	@	.24
No. 2 White shirt cuttings	.14	@	—
Fancy shirt cuttings	.13½	@	.14
No. 1 Old whites	.10½	@	.11
Thirds and blues	.04½	@	.04¾

Per cwt.

Black stockings	5.00	@	—
Roofing stock			
No. 1	2.50	@	—
No. 2	2.40	@	—
Roofing stock			
Manila rope	8.50	@	—
Gunny bagging	3.50	@	3.75
No. 2	3.50	@	—

The Mathieson Alkali Works (Inc.)

General Offices

25 West 43rd Street **New York City**

Works **Niagara Falls, N. Y.**

Works **Saltville, Va.**

"EAGLE THISTLE" BRAND OF PRODUCTS

High Test Bleaching Powder

Packed in Steel Drums, air tight, insuring full strength at point of consumption.

Special wooden lined drums for export.

Liquid Chlorine

100% pure, anhydrous, in improved 100 lb.—150 lb.—2,000 lb. containers.

Soda Ash

58 per cent, both light and dense shipped in bulk—Bags and Barrels Special packages for export.

Caustic Soda

Solid—Ground—Flaked

60%—70%—72%—74%—76%—78% Grades.

The electrolytic 78% Grade, analyzing 99.70% Hydrate of Soda, purest caustic made.

Bicarbonate of Soda

Packed in Cases—Bags—Barrels—Kegs

If you have a problem to solve write us and get the advantage of our Technical Department.

WANT AND FOR SALE ADVERTISEMENTS

HELP WANTED

CLASSIFIED RATES

Minimum rate for advertisements of 25 words or less, first insertion, $1.00.

SITUATION WANTED, 4 cents a word for first insertion and 2 cents a word for each subsequent insertion of same ad. No ad of less than 25 words accepted.

HELP AND MISCELLANEOUS WANTS, and small For Sale Ads, 4 cents a word for each and every insertion. No ads of less than 25 words accepted.

When answering advertisements, please address the Box Number given in ad.

Answers can be forwarded care Paper Trade Journal, and will be promptly forwarded without extra charge. All should be sent to the New York office, 10 East 39th street. And all should be addressed as the advertisement directs in every case and not simply to the paper.

All classified ads for the current issue must be in hand not later than Monday preceding date of publication.

WANTED—Superintendent for two-machine mill, running tissues and light weight papers on cylinder machines. Wanted high grade man, and to such would be paid satisfactory salary. Address, Box 2580, care Paper Trade Journal. tf

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WANTED—First class Millwright for two-machine Tissue mill. Steady, married man preferred. State experience and give references. Address, Box 2777, care Paper Trade Journal. N-18

MACHINE Tender for Asbestos paper mill. Two tours. Will earn between $55 and $60 per week, and a good monthly bonus for production. This means experienced men only, none others need apply. Mill is located near New York. Address, Box 2788, care Paper Trade Journal. N-18

WANTED—Capable Assistant Superintendent in mill manufacturing light weight straw paper, one familiar with manipulation of stock for the manufacturing of .009 point corrugating. Advise age and experience in detail in replying. Address, Box 2756, care Paper Trade Journal. tf

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WANTED—Large Paper Mill Organization increasing its sales force, has opening for aggressive, successful paper salesman, who controls trade, knows how to obtain quantity business and is accustomed to make large income, but wants to progress. Address, Box 2739, care Paper Trade Journal. tf

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WANTED AT ONCE—Draftsman with paper mill experience. Address, Box 2767, care Paper Trade Journal. N-18

LARGE DYESTUFFS HOUSE requires services of experienced paper maker for position as salesman and demonstrator in Eastern territory. Must be experienced in matching shades dyed in the beater on all grades of stock. Give full particulars as regards education, experience, references, etc. Address, Box 2769, care Paper Trade Journal. N-18

WANTED IMMEDIATELY—Master mechanic for pulp and paper mill; one well acquainted with equipment for sulphate pulp. Apply Hummel-Ross Fibre Corporation, Hopewell, Virginia. N-18

WANTED—Experienced Beaterman for fine tissue mill in Jersey City. Address, Box 2793, care Paper Trade Journal. N-18

WANTED—Two good paper mill millwrights, must be familiar with wood room, sulphite and machine room work. Good town to live. Cheap rents. Good working conditions. Open shop. Steady men wanted. Address, Box 2794, care Paper Trade Journal. N-18

WANTED—Paper brokers to handle a line of plain waxed papers. Give territory covered and other information. Address, Box 2795, care Paper Trade Journal. D-16

A RESPONSIBLE CONCERN selling mainly to the paper box trade, has a very good opportunity for an able salesman. Replies treated in confidence. Address, Box 2804, care Paper Trade Journal. N-18

WANTED—Up-to-date beaterman for two-machine mill, Fourdrinier and cylinder, making glassine bond and waxing. Address, Box 2805, care Paper Trade Journal. D-2

WANTED—Superintendent for two-machine board mill. Must have experience making high grade middles for coating purposes and high grade plain white lined blanks. State age, experience and salary expected. All replies treated strictly confidential. Address, Box 2806, care Paper Trade Journal. D-2

WANTED—Mechanic to operate a small Paper Bag Plant in Canada. Must be thoroughly reliable and capable of assuming full responsibility of the production. Give full particulars, experience, salary expected, etc. Address, Box 2807, care Paper Trade Journal. N-18

WANTED—Salesman to cover State of New Jersey, wholesale trade only. Salary depends upon ability and experience. Write or call by appointment. Continental Paper & Bag Mills, J. Gold, N. Y., Sales Manager, 268 West Broadway, N. Y. City. N-18

WANTED—A chief draftsman. One with knowledge of paper mill machinery preferred. Address, The Shartle Brothers Machine Company, Middletown, Ohio. D-2

SITUATIONS WANTED

YOUNG MARRIED MAN, eleven years' experience selling and purchasing, fine and coarse papers, boards and specialties, familiar with sources of supply, wishes to connect with reputable firm of good standing as executive, purchasing agent or salesman, best credentials. Address, Box 2791, care Paper Trade Journal. N-18

PAPER SALESMAN, NEW YORK CITY, can produce large volume of business. Wishes connection with Mill Agency Company or Mill. Substantial drawing account on commission basis. Address, Box 2734, care Paper Trade Journal. tf

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SUPERINTENDENT now employed, but desires to make a change. 20 years' experience in paper making, tissues, crepe, news, bag and wrappings, also experienced in manufacture of ground wood. Prefer a ton or two machine mill. Best of references. Address, Box 2639, care Paper Trade Journal. tf

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AUDITOR AND ACCOUNTANT, graduate, with large pulp wood company, now in charge large office, desires to make change. Executive ability. United States or Canada. Address, Box 2780, care Paper Trade Journal. N-25

CHIEF ENGINEER, seventeen years' experience. Grade 1A Gold Seal Jersey License, also New York. Best of reference. Can guarantee results. Married, steady. Address, Box 2781, care Paper Trade Journal. N-18

SITUATIONS WANTED

POSITION WANTED by Superintendent who is a practical Papermaker with eighteen years' experience on all the better grades of Combination and Container Board. Thoroughly familiar with all repairs and general upkeep of mill and a knowledge of steam and power plant operation. Can furnish the very best of references. Address, Box 2782, care Paper Trade Journal. tf

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PRACTICAL papermaker and first class mechanic, age 35, at present employed as assistant superintendent, wishes position as superintendent or assistant superintendent. Will consider position as machine tender, or boss machine tender with chance for advancement. 12 years of experience running fourdrinier and cylinder machines on all grades. Can take charge of production, upkeep, repairs and improvements. Address, Box 2787, care Paper Trade Journal. N-25

WANTED—Position as Superintendent. 20 years' experience. Understand all acid systems and latest methods of cooking, and have thorough knowledge of bleaching. I know my business and am qualified to build, equip or reorganize any existing plant. A personal interview will enable me to submit further details. Best of references. Married. Address, Box 2797, care Paper Trade Journal. D-2

MASTER MECHANIC wants position. Expert construction, reconstruction, installing, equipment and economical maintenance of mills making Book, Bond, News or Cylinder machines making Board, Bristols or Tissue with and without Edwards attachment. Address, Box 2778, care Paper Trade Journal. N-25

MANAGER DESIRES CHANGE. Sixteen years with present connection. Experienced in all office lines except selling. Good general knowledge of manufacture from log to finished product. Address, Box 2779, care Paper Trade Journal. D-2

MAN WITH TWENTY YEARS' EXPERIENCE, grinding, calender rolls, also brass and rubber rolls, and knowing the required crowns, wants temporary or permanent work, by hour or contract. Address, Box 2810, care Paper Trade Journal. D-2

WANTED—Position as Manager or Chief Engineer by man with 15 years of broad experience in the paper and pulp industry. Capable executive, good organizer, full of initiative and resourcefulness. Engineering experience covers complete design and construction of pulp, paper and chemical plants and hydro-electric developments. Management covers board manufacturing and conversion, and news mill experience. Address, Box 2811, care Paper Trade Journal. D-9

MANUFACTURERS OF PAPER and Paper Products desiring services on commission basis of capable salesman with an established following among New England jobbing trade. Address, Box 2812, care Paper Trade Journal. D-9

TOUR FOREMAN wishes to make change in same capacity or running cylinder machine. 12 years' experience on box boards. Address, Box 2813, care Paper Trade Journal. N-18

WANTED POSITION as Manager or General Superintendent. Have practical experience in all lines of work required in paper making on nearly all grades of paper. Have practical experience on Fourdrinier, Harper, Dutch Tissue, Cylinder and Combination machines. At present manager and general superintendent. Have legitimate reasons for changing. Past positions are open for inspection. Address, Box 2814, care Paper Trade Journal. D-23

WANTED—POSITION as night foreman, 25 years' experience on all grades of paper, both as machine tender and beaterman. Address, Box 2815, care Paper Trade Journal. N-18

SITUATIONS WANTED

ASSISTANT SUPERINTENDENT. Scotch. Been employed with the best mills in Scotland and India making fine papers as machineman, beaterman and last two years as superintendent. Wants job as above until used to conditions here. Apply in first instance, Mill Supply Department, Beveridge Paper Company, Limited, Montreal, P. Q. N-18

YOUNG MAN, 24, ambitious, having knowledge of practically all grades of paper, wishes to connect with reliable firm where good future awaits. Address, Box 2643, care Paper Trade Journal. tf

SUPERINTENDENT wants position. 22 years' experience, all grades of paper, including chip, news, coated and asbestos boards, also tissues. Can furnish best of references. Address, Box 2796, care Paper Trade Journal. N-18

Mill Connection Wanted

Fully equipped offices in New York city, five veteran salesmen. In close touch for thirty years with large users of super, machine finish, offset, blank and litho coated papers. In a position to handle to advantage as agents the product of an up-to-date mill. Address, Box 2786, care Paper Trade Journal. N4-1

FOR SALE

FOR SALE—Two Cylinder Moulds in first class condition. 30" diam. 78" long. For full particulars inquire, Ford Roofing Products Company, 520 Conway Building, Chicago, Ill. N-18

FOR SALE—Three Falcon Presses, 10x15, Crown Folio size. For full information, address Purchasing Department, Continental Paper & Bag Mills, 16 E. 40th street, New York city. N-18

FOR SALE—Noble & Wood Mammoth Jr. Jordan Engine, Noble and Wood Washer Screen and Wood's Pulp Thickener and Saveall. J. H. Roberts, 79 Franklin street, New York city. Phone, Franklin 466. N-25

FOR SALE—14 Noble & Wood 1,800 lb. beaters roll 72"x44", condition good. For further information, apply the Stamsocott Company, Hopewell, Virginia. N-18

FOR SALE—AIR COMPRESSORS

One Ingersoll-Rand Air Compressor, direct steam driven, steam cylinder, 10"x12", air cylinder 10¼"x12", 100-lb. pressure, 500 ft. per minute capacity.

One Ingersoll-Rand Air Compressor, belt driven, 10x6½" cylinders, Imperial typeXB-2, driven by 30 H.P. motor, 60 cycle, 440 volts, 865 R.P.M., with starter and pulley.

FOR SALE—PUMPS

Two Blake & Knowles Service Pumps, 12"x5"x12", 500 lb. pressure.

Two Fairbanks-Morse Service Pumps, 10"x5"x12", 150 lb. pressure.

One Dayton Hydraulic Mach. Co., Rotary Pump, size 8, SSV type, belt driven, 4" intake, 3" discharge.

Two Worthington Compound Pressure Pumps, 9" and 14"x2¼"x15", 2,000 lb. pressure.

One Epping-Carpenter Service Pump, 9"x8½"x10", 100 lb. pressure.

One Epping-Carpenter Service Pump, 12"x12"x12", 500 lb. pressure.

One Wilson-Snyder Compound Pressure Pump, 12" and 18"x6½"x18", 100 lb. pressure.

Two Fairbanks-Morse Compound Service Pumps, 8" and 12"x10"x12", 100 lb. pressure.

Two Worthington Booster Pumps, 9"x5"x10" 500 lb. pressure.

One American Service Pump, 7"x6"x10", 100 lb. pressure.

Two W. H. Wood Hydraulic Pumps, 16"x2¾"x12", 1,500 lb. pressure.

Address
MILLER RUBBER COMPANY,
Department 20,
Akron, Ohio

FOR SALE

FOR SALE—One Noble and Wood Mammoth Jordan complete with one-piece shell liner and new set of plug filling. Practically as good as new. Immediate delivery. Price $1,500.00. Address, Gibbs-Brower Company, 261 Broadway, New York city. N-25

FOR SALE—Two Duplex Moore & White paper cutters, knives 120" long, in first class condition. Address, Box 2594, care Paper Trade Journal. tf

FOR SALE—One Miller Duplex Beating Engine, manufactured by Downington Mfg. Company; for information address, Box 2665, care Paper Trade Journal. tf

FOR SALE—No. 1400 Beloit iron tub, double lighter beater. Extra set of filling. This beater in operation but can be released January 1st. Address, Box 2783, care Paper Trade Journal. N-25

FOR SALE—One No. 10 Moore & White Speed Changer, one constant speed cone, 250 revolutions, 85 H.P. capacity, ratio of change, 2½ to 1. One No. 11 Reeves Transmission 40 to 100 H.P. capacity. The above are in good second-hand condition, and may be seen in operation. They are being displaced by electric drives. Address, Box 2798, care Paper Trade Journal. N-25

FOR SALE—Cheap, No. 10 Moore & White Speed Change complete. Also 20x44 Rickard-Corliss Engine. S. Austin Bicking Paper Mfg. Co., E. Downingtown, Pa. N-18

MACHINERY FOR SALE in good condition. One large size Thresher Duster, two Whipper Dusters, two Holyoke Wing Dusters, four Daniels Rag Cutters, iron frames, double blades. Address, Box 2808, care Paper Trade Journal. N-25

For Sale

1 62" Langston Surface or Drum Rewinder and Slitter, with 21 sets of cutters, for immediate delivery.

For price address St. Louis Paper Can & Tube Co., St. Louis, Mo. tf

MISCELLANEOUS

WANTED—One No. 2 Lannoye Pulper. Two 9" Calender rolls. Advise what you have to offer. Give full description and price in first letter. Address, Box 2816, care Paper Trade Journal. N-25

WANTED—Two good automatic machines for making wood plugs for roofing rolls. State make. Address, Box 2817, care Paper Trade Journal. N-25

GRINDER WANTED for stone 27 or 32-inch face. State make and price. Address, Box 2818, care Paper Trade Journal. N-25

WANTED—One 72" or over wet machine in good condition. Must be for immediate delivery. Address, The New York and Maryland Pulp and Paper Company, 522 Fifth Avenue, New York. N 18

PULP WOOD
EDM. CONWAY & SON
282 ST. PAUL STREET,
QUEBEC, P. Q.,
CAN. D-

WANTED AT ONCE—

Fourdrinier Part about 54" with shake,
One first and one second press,
Five Dryers with frames and Gears, 52-56" face,
Reels, Drums and Revolving Sheet cutter to fit 52" machine,
Two Beaters of about 500 lbs. capacity equipped with washers,
Two globes and one Rag Duster.

Address, Box 2802, care Paper Trade Journal. N-25

MISCELLANEOUS

WANTED—One single cylinder second hand Wandell Rotary Screen in good condition. Address Holden Paper Co., Newburgh, N. Y. tf.

INCREASE Your Knowledge of Paper and Its Use. Send $2.00 to Geo. Banta Publishing Co., Book Dept., Menasha, Wis., and receive postpaid a copy of "From Paper Mill to Press Room," by William Bond Wheelwright. Nov. 25

WANTED TO PURCHASE—A second-hand Paper Slitter from 50" to 76". Address, Box 2801, care Paper Trade Journal. N-25

WANTED—New or used Kollergang in good condition, complete with stones. In reply quote price. Address, Box 2799, care Paper Trade Journal. N-18

Manufacturers of Kraft Papers

who are looking for favorable locations, or whose present plants are embarrassed by lack of raw material or limited financial resources will be interested in the economic advantages of Sault Ste. Marie.

Raw Material—a practically inexhaustible supply of soft woods, easily available by both rail and water.

Transportation—Both lake and rail transportation.

Power—Cheap dependable electric power.

Labor—An amply supplied both skilled and common labor market.

We invite personal examination of the advantages herein stated.

(All negotiations strictly confidential).

C. E. Chipley, Industrial Secretary,
Sault Ste. Marie, Michigan.

N-25

FOR SALE

Fourdrinier Part—101" x 60 ft. with Savery Shake.

Dryers: 12—48" x 110"; 8—48" x 106"; 1—84" x 67"; 3—28" x 62"; 5—36" x 40".

Pressers: 2 sets first and second with rolls 18" x 110"; 1 set first and second presses with rolls 18" x 96", all equipped with Pusey Jones Bell crank housings.

Beaters: 1—70" x 54" Dillon; 2—60" x 60" Downingtown Iron Tub; 1—60" x 52" Jones; 3—40" x 40".

Jordans: 1—Wagg Majestic; 1—large Horne; 2—49" Horne; 2—No. 1 Claflins.

Super Calenders: 1—55" Granger, 7 roll; 1—48" Holyoke, 7 roll; 2—42" Holyoke, 7 roll.

Revolving Sheet Cutters: 1—104" Horne; 1—84" Clark; 2—74", 1—56", 1—52", 1—50" and 1—43" Hamblets; 1—48" and 1—40" Moore & White; 2—43" Finlays.

Reels: 1—84", 1—96", 1—110" Upright Pusey & Jones two drum.

Slitters & Winders: 1—120" Warren; 1—114" Kidder; 1—110" Kidder; 1—90" Pusey & Jones single drum; 1—46" Kidder; 1—36" Kidder; 1—31" Meisel.

Screens: 14—Packer 12 plate open-side; 6—6 plate New Success; 3—Wandel double cylinder; 3—Wandel single cylinder.

Stuff Pumps: 2—Goulds 8" x 112" triplex; 1—Deane triplex, 8" x 12"; 1—Goulds triplex, 9" x 10".

FRANK H. DAVIS COMPANY
Established 1889
Rebuilt Paper Mill Machinery
175 Richdale Avenue Cambridge, Mass.

DO YOU TEST YOUR PAPER?

Every person who makes or markets paper should be familiar with paper testing methods and the apparatus employed in making microscopical, physical, and chemical examinations of paper. Such a publication is Paper Testing Methods, issued by the Technical Association of the Pulp and Paper Industry, 542 Fifth Avenue, New York.

Besides formulas for the stains and chemical reagents used in the identification of fibers in paper, Paper Testing Methods gives tests for fillers, rosin, casein, and glue. The causes of imperfections in paper are described and instructions are given for detecting foreign material. Illustrated with cuts of testing devices and laboratory apparatus.

Paper Testing Methods will be sent to any address, postage paid, for $1.00.

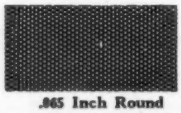
Address The Technical Association, 542 Fifth Ave., New York, N. Y.

Perforated Metal Screens

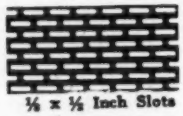
FOR

PULP AND PAPER MILLS

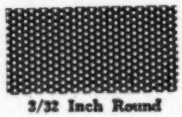
STEEL, COPPER BRASS, BRONZE and other Alloys



.065 Inch Round



⅛ x ½ Inch Slots



3/32 Inch Round

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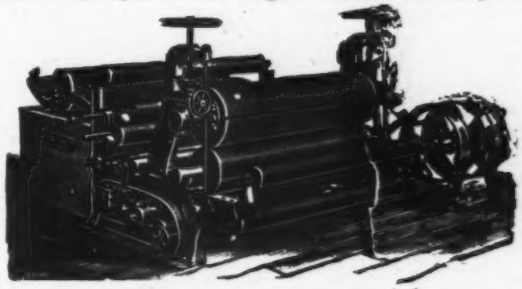

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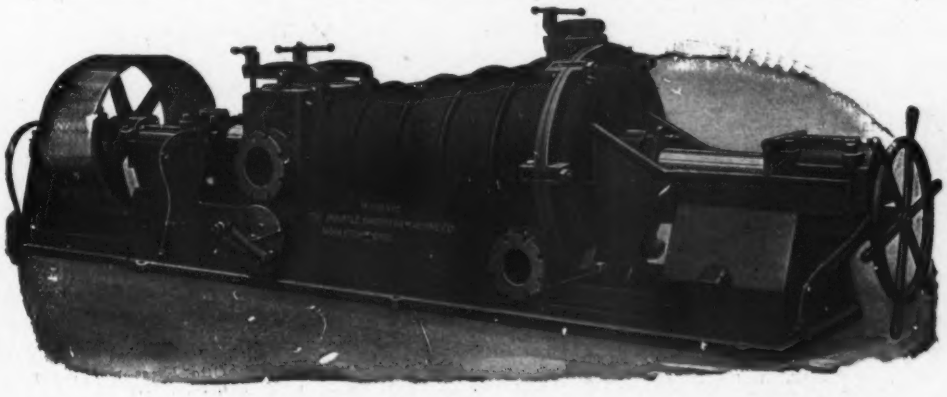

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Northern New York Shipping Facilities Bad

[FROM OUR REGULAR CORRESPONDENT.]

WATERTOWN, N. Y., November 15, 1920.—Big shippers in northern New York are now showing evidences of becoming desperate over the transportation facilities available here. Oue of their numerous complaints and implorings may crystallize some definite movement by the Watertown Chamber of Commerce, the Northern New York Development League and other commercial organizations to secure a remedy.

Complaints in large numbers are being received by the local Chamber of Commerce over conditions that obtain here. Invariably where two or more large shippers are assembled there develops discussion of the subject and the possibilities of relief.

The possibility of a competing railroad line in this section is looked upon with misgivings. The next best solution of the problem is considered the connection of the section with waterways. The completion of the Black river canal through to the lake is viewed with some degree of pleasure, but this does not seem to be a proposition fraught with immediate relief.

A recent communication came from one of the allied paper industries of the section, and it seemed typical of some of the incidents experienced by others. A shipment was booked for Pittsburgh and a schedule of transportation prices for the shipment was sought.

It developed that the buyer had to pay twice as much for the transportation of the goods as he paid the manufacturer.

It is pointed out that just such conditions will be overcome if concerted action along the most feasible lines can get results. The influence of commercial organizations will be devoted to some solution of the problem.

For Extension of Black River Canal

[FROM OUR REGULAR CORRESPONDENT.]

WATERTOWN, N. Y., November 15, 1920.—Resolutions favoring the extension of the Black river canal from Carthage to Lake Ontario and opposing the St. Lawrence river canal project as not feasible nor for the best interests of the United States were adopted at the meeting of the New York State Waterways Association at Buffalo from which Senator George H. Cobb and Secretary Ralph S. Baker of the Chamber of Commerce returned Friday night. The resolution on the local canal project was introduced by Senator Cobb, who was chairman of the resolutions committee.

Local delegates took a conspicuous place in the deliberations of the convention. Although third vice-president of the Association, Senator Cobb presided at many of the sessions, headed the resolutions committee, and was re-elected third vice-president; Celestine C. Burns was returned as a member of the executive committee, and Secretary R. S. Baker was named a member of the committee on conservation. E. S. Cullings, secretary of the Board of the Black River Regulating District, presented one of the important papers of the meeting, while Secretary Baker and Senator Cobb were among the speakers.

In his speech at the last session Secretary Baker told of the deep interest held by the Watertown Chamber of Commerce in the activities of the Association because of the fact that many of its members were extensive holders of interests in watr power rights and experts on the subject. He urged better transportation facilities for this section of the state and also pointed to the importance of river regulation under the Mashold bill.

Patents, Experiments and Criticisms

Benjamin Cataldi, of Torino, Italy, has obtained a patent in Norway on drying vegetable fibres in a vacuum or near vacuum. The fibres are first treated with lye, then washed to remove the lye as far as possible, and thereupon dried in a vacuum or a compartment from which the air has been withdrawn more or less. When dried the fibers are exposed to chloric gas, finally they are given another bath in lye. It is claimed that drying in a vacuum the fibers retain enough alkali to bind the hydrochloric acid formed by the chloridizing process. Thus the production of cellulose is facilitated, claims the inventor.

Jan Carel van Wessen, of Bloemendaal, Holland, has obtained a patent on a process which, he claims, will convert wood, ligneous or any other cellular matter into a stock of higher value. The matter is ground dry, as far as possible. The remaining humidity evaporates in the form of steam, the heat created by the friction of almost dry matter being ground, converting the water into steam.

Paul Krahl, of Hamburg, has a patent on removing obstacles contained in sulphite waste liquor which prevented its being used as a glossy finish on leather. Krahl removes the sticky quality of the fluid by treating it with ethyl-chloride. The latter forms a liquid undissolvable in water. Thus a fluid, wholly homogeneous, is formed which has lost its adhesiveness and at the same time forms a shiny polish when applied to the surface of leather. The waste liquor is heated to about 80 degrees C. About 5 to 10 per cent in weight of ethyl-chloride is slowly added while the liquor is being stirred.

H. Pringsheim and H. Magnus, who had published a treatise on the acetyle content of lignin and had been attacked by Prof. Schwalbe and Dr. E. Becker, have renewed their offensive, claiming the divergent results obtained by their critics to be due to a different mode of procedure. While Pringsheim and Magnus had hydrolized under pressure, using soda lye, their critics had boiled the matter for three hours, using 2.5 per cent. of sulphuric acid.

Miami Valley Paper Men at Chicago

[FROM OUR REGULAR CORRESPONDENT.]

DAYTON, Ohio, November 15, 1920.—A number of Miami Valley paper men attended the meeting of the National Paper Trade Association at Chicago last week. All were impressed with the facts presented showing the growing importance of the paper business. The statements made by speakers that "more paper will have to be produced to fill the increasing needs," proved a relishing bit of information, though not entirely a surprise.

Paper board manufacturers also met with the A. P. & P. A. and the local contingent was interested in its proceedings. The conservation measures advanced were particularly timely, returning members stated, and every effort will be made in the Miami Valley to carry out the injunction, "Avoid waste and conserve scraps."

PULP EVALUATION

(*Continued from page* 162)

apparent cause of error is in stirring the stock and causing it to circulate in currents.

The methods and conditions for testing have not been taken up here because of the work already done on the subject.[1]

Conclusions

From the above results it may be safely said:

1. That the fibre direction is the controlling factor in strength tests.

2. That before a sheet can be called uniform the fibres must be uniformly distributed.

3. That such a condition cannot be obtained when the hand mold is manipulated as under the present method.

4. That the suction mold does eliminate many of the undesirable factors, and the result is a sheet more nearly perfect than can be made by any of the other methods described.

[1] "How Paper is Affected by Humidity," by Otto Kress and Philip Silverstein, in *Paper*, Vol. XIX, No. 25, p. 13, Feb. 28, 1917.

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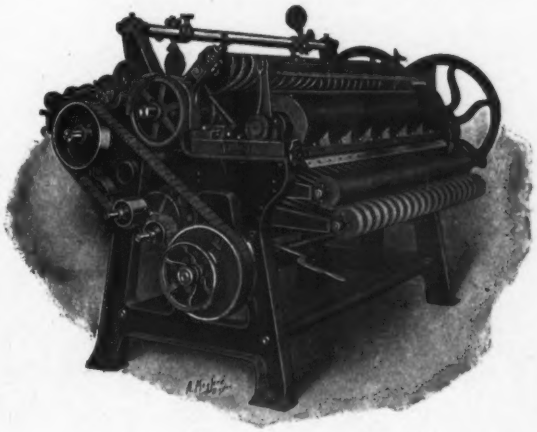

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HISTORY OF PAPERMAKING IN THE UNITED STATES

(COMMITTEE ON BIBLIOGRAPHY, TECHNICAL ASSOCIATION OF THE PULP AND PAPER INDUSTRY CONTRIBUTION No. 20)[2]

COMPILED BY MISS MAUDE V. DICKINSON,[1] LIBRARY SCHOOL, UNIVERSITY OF WISCONSIN.

In this contribution to a bibliography, references have been confined almost entirely to the subject of print paper, with especial emphasis placed upon the history of newsprint paper manufacture. The entries are confined for the most part to American subjects, with the exception of some English manuals giving important material on papermaking which are equally descriptive of processes used in the United States.

It should be said that an entry has been listed but once; while it may be found to deal with various phases of papermaking, it has been put with the class under which it seemed most logically to fall.

The following subject headings have been used:

Bibliographies.
General references.
History.
  General.
  Early.
  Later.
Statistics.
Economic aspects of paper industry.

Bibliographies.

SURFACE, HENRY E.

Bibliography of the pulp and paper industry. Washington, Govt. print. off., 1913.

48 p. 23 cm. (U. S. Dept. of agriculture. Forest service. Bulletin 123. Forest products laboratory series).

SURFACE, HENRY E.

A select paper bibliography entitled "United States government publications pertaining to pulp and paper." (Washington, 1916.)

16 p. 22½ cm.

A revision of "A list of United States public documents pertaining to pulp and paper, published in the Journal of Industrial and Engineering Chemistry, July, 1913 (vol. 5, no. 7).

A reprint from Paper, Oct. 4. 1916, vol. 19, no. 4, pp. 25-30, being contribution no. 1 of the Committee on Bibliography, T. A. P. P. I.

GENERAL REFERENCES.

Books and Pamphlets.

BETTS, H. S.

Paper—One of Wisconsin's chief products.

Wisconsin arbor and bird day annual, 1913, pp. 13-21. Madison, State supt. of public instruction.

An illustrated article treating of Wisconsin's activities in the making of paper.

BLACKBURN, W. D.

Paper and its manufacture.

Pennsylvania—Industrial statistics bureau. Annual report. 1876-1877, pp. 806-818.

Facts are given relating to the history of papermaking and of the growth of the industry with statistics.

COCHRANE, C. H.

Age of paper.

Modern industrial progress. 1904, pp. 388-399. Lippincott.

This treats of the history of papermaking in the United States, processes involved and materials used; also includes some of the methods of testing paper.

The same article is found in Mechanic Arts, edited by R. C. MacLaurin. 1911, pp. 181-189.

MCKEE, R. H.

Training men for positions in pulp and paper mills.

Maine—Labor and industry dept. Biennial report, 1913-1914. pp. 149-159.

This article gives curriculum and treats of the buildings and equipment, also the general character of the training.

MILLS, J. C.

Paper.

Searchlights on some American industries. 1911, pp. 85-130. McClurg.

Facts are given relating to the history, processes, raw materials used, some of the interesting mills, the manufacture of paper from peat and ground pulp, and also the growth of the industry in the United States.

PAPERMAKING.

Pennsylvania—Industrial statistics bureau. Annual report, 1897, pp. 61-80.

An illustrated article containing some information of both interest and value. It treats of the history of papermaking in the United States, the soda and sulfite processes and also gives facts and statistics concerning the paper mills in Pennsylvania and the manufacture of paper.

PULP and paper industry in Maine.

Maine—Industrial and labor statistics bureau. Annual report, 1906, pp. 125-193.

Facts and statistics in regard to the pulp and paper industry in the United States in 1904, the industry in Maine in 1906, and material on the soda and sulfite processes and the history of papermaking in the state.

SMITH, A. M.

Paper.

Printing and writing materials. 1901, pp. 142-162. Philadelphia, pub. by the author.

Includes material on the history of papermaking, materials used, and some of the processes.

U. S. *Bureau of Foreign and Domestic Commerce.*

Paper and stationery trade of the world. Washington, Govt. print. off., 1915. Compiled from consular reports and supplemented by Grosvenor Dawe, commercial agent.

458 p. 24½ cm. (Special consular reports, no. 73).

This includes facts relating to the industry in the U. S.

Articles in Periodicals.

BEADLE, CLAYTON.

Technical education as applied to paper manufacture.

J. Royal Soc. Arts 1, 195-206 (Jan. 31, 1902).

Though the article was written for the English papermaker, the reader's attention is casually drawn on pages 195-196 to the opinion Mr. Beadle presents concerning the importance of the paper industry in the United States.

(*Continued on page* 178)

[1]This bibliography has been made available to the Committee on Bibliography through the co-operation of Miss M. E. Hazeltine, Director of the Library School of the University of Wisconsin. Hitherto it has been available only through the Public Affairs Information Service. While the work is incomplete, in that few references are made to the technical Paper journals, it does present many out-of-the-way sources, which are valuable from the historical point of view. The Committee hopes to supplement this list at a later date with other and more technical data. In justice to Miss Dickinson, it should be stated that the sections of her thesis dealing with materials, processes, etc., are omitted because they have been covered in earlier bibliographies or more properly find a place in later ones.

[2]The 19th contribution of the Committee on Bibliography was "The Sizing of Paper," by Clarence Jay West, which was published in THE PAPER TRADE JOURNAL, vol. lxxi, No. 20, pages 50, 52, 54 and 56.

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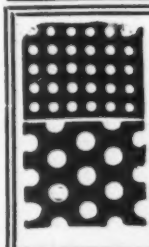
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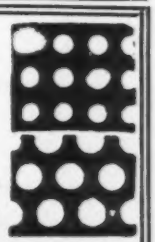

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HISTORY OF PAPERMAKING IN THE UNITED STATES

(*Continued from page* 176)

BLACK, A. A.
Making of paper.
Chautauquan xvii, 289-293 (June, 1893).
The last few pages treat of the growth of the paper industry in the United States and the materials used in the manufacture of paper.

BUCK, LUCIEN.
Manufacture of pulp and paper.
Paper xix, no. 23, 88—114, 123 (Feb. 14, 1917).
Illustrated article giving a brief outline of the history of the industry, its processes, and its development.

DEVELOPMENTS in the paper and pulp industry.
Engineering Record lvii, 217-218 (Feb. 22, 1908).
Recent changes in the industry which foreshadow those to come. Some of the important features of a paper read before the American Paper and Pulp Association by its chemist, A. D. Little.

EFFECT of war on the paper industry.
Publishers' Weekly lxxxviii, 466 (Aug. 15, 1914).
Shows how the war may affect the paper industry in the United States.

GOGGINS, B. R.
Paper and pulp industry and conservation.
American Forestry xvi, 415-418 (July 10, 1916).
An address at the opening of the Forest Products Laboratory in 1910.

HASTINGS, A. C.
Difficulties and needs of the paper and pulp industry.
Annals of the American Academy of Political and Social Science xxxiv, 467-470 (Nov., 1909).
An explanation of the conditions concerning the paper and pulp industry at the time of writing.

HOBART, J. T.
Papermaking industry.
Engineering Magazine ii, 488-495 (Jan., 1892).
Treats of the growth and manufacture of paper.

KEENAN, THOMAS J.
Evolution of the pulp and paper industry.
Sci. Am. S. lxxx, 151 (Aug. 28, 1915).
Some achievements in the pulp and paper industry in the United States.

LOOKING ahead in the paper industry.
Publishers' Weekly xci, 922-924 (Mar. 17, 1917).
Some phases of the paper problem with means of arriving at their future solution.

MOORE, F. C.
Contributions of the chemist to the pulp and paper industry.
J. Ind. Eng. Chem. vii, 292-293 (Apr., 1915).
The president of the American Paper and Pulp Association explains how the industry has been largely dependent on the work of chemists.

MORE uses of paper.
Chambers' J. lxi, 742-743 (Nov. 22, 1884).
One paragraph of the article is devoted to the cedarbark mill at New Bedford, Mass.—the first enterprise of the kind undertaken. Other interesting facts are given pertaining to the paper industry in the U. S.

NEWSPAPER Publishers' Association calls for reduction in paper consumption.
Publishers' Weekly xc, 377 (July 29, 1916).
The association presents the problem of the scarcity of newsprint paper and suggests six methods of economy.

PAPER famine.
St. Nicholas xliv, 69-70 (Nov., 1916).
Why the United States is confronted with a paper famine.

STEPHENSON, J. N.
Chemical engineering for papermakers.
Educational Review li, 522-525 (May, 1916).
An explanation of how the University of Maine is training men for the paper industry.

WEBER, O. L. E.
Future of the pulp and paper industry.
Paper xiii, no. 24, 40-42 (Feb. 25, 1914).
The favorable prospects are discussed.

WHEELWRIGHT, W. B.
Paper situation.
Sci. Am. cxiv, 472-473 (May 6, 1916).
Some of the factors are discussed which are responsible for the stringency in paper since the beginning of the European War.

WISCONSIN paper merger.
Publishers' Weekly lxxiii, 2007 (June 27, 1908).
Consolidation of three large Wisconsin plants.

WORLD'S paper consumption.
Sci. Am. xcv, 306 (Oct. 27, 1906).
Some facts are given concerning the manufacturing enterprise in the United States.

HISTORY.

A—General History.

BEADLE, CLAYTON.
Recent history of papermaking.
J. Royal Soc. Arts xlvi, 405-417 (Mar. 18, 1898).
Pages 415-417 contain material bearing on the history of papermaking in the United States.

BOWKER, R. R.
A sheet of paper.
Harper's Magazine lxxv, 113-130 (June, 1887).
A general historical treatise is given, on paper and papermaking, with facts pertaining to the industry in the United States, as well as that in other countries.

MUNSELL, JOEL.
Chronology of the origin and progress of paper and papermaking. 5th ed., with additions. Albany, J. Munsell, 1876.
2 p. l. 263 pp. front, illus. 20 cm.
A general chronology which covers the years from 670 B. C. to 1876 A. D. Beginning with 1690 some valuable historical material pertaining to papermaking in the United States has been recorded.

PAPERMAKING as conducted in Western Massachusetts.
With a brief history of the business from the earliest ages to the present time, with interesting data regarding the manufacture of paper in detail. Springfield, Mass., C. W. Bryan & Co., 1874.
71 pp. 23½ cm.
A pamphlet which treats not only of papermaking and the various mills of note in western Mass., but which also gives a short history of the industry in the U. S., brief descriptions of machinery, kinds of materials used in the manufacture of paper and other important data regarding the paper industry. It contains an extensive list of fibrous raw materials for papermaking.

(*Continued on page* 180)

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HISTORY OF PAPER MAKING IN THE UNITED STATES

(*Continued from page* 178)

WEEKS, L. H.

History of paper manufacturing in the United States, 1690-1916. New York, Lockwood Trade Journal Co., 1916.

"It is the only attempt that has been made to bring into one complete, compact narrative all the material facts relating to the industry and to present in an exhaustive and comprehensive manner, on the purely historical side, the annals of this branch of American manufacturing, from the erecting of the first little mill in Philadelphia, in 1690, to the opening years of the twentieth century."

B—Early History.
Books and Pamphlets.

ASHMEAD, H. G.

Ivy mills and the Willcox family.

History of Delaware County, Pennsylvania. 1884. pp. 491-497.

An interesting account of the famous Willcox mills.

PIDGEON, DANIEL.

Pittsfield—Dalton—An industrial pioneer.

Old-world questions and new world answers. 1885. pp. 53-62. Harper.

Brief sketch of the early Dalton paper mill.

SMITH, J. E. A.

Pioneer papermaking in Berkshire. Life, life work and influence of Zenas Crane. (Holyoke, Mass. C. W. Bryan & Co., printers, 188-).

4 p. l., (3)-55 p. front, 23½ cm.

In this pamphlet the life of the pioneer paper manufacturer of Berkshire County, Mass., is so associated with early papermaking that the work may be considered a contribution to the history of that subject.

THOMAS, ISAIAH.

English America: now the United States.

History of printing in America. 1874. Vol. 1, pp. 13-37. Albany: Munsell.

A portion of the chapter treats of the early paper mills in the United States and gives facts concerning the paper industry in the early part of the nineteenth century.

WESTON, BYRON.

History of papermaking in Berkshire County, Massachusetts.

Berkshire Historical and Scientific Society. Collections vol. 2.

A pamphlet treating of various paper mills and their owners in the early days of the county and of improvements since in the making of paper.

WILLCOX, JOSEPH.

Ivy mills, 1729-1866. Baltimore: Lucas, 1911.

"The contents of this book . . . were, with few exceptions, printed at various times in the Records of the American Catholic Historical Society."—*Preface.*

The first of the book gives interesting details, including history and operation, of the famous old paper mill at Ivy Mills.

Articles in Periodicals.

BOIES, JOHN.

Contribution to the early history of papermaking in the United States.

J. Franklin Institute xvii, 217-218 (Apr., 1834).

The article gives something of the early history of the first paper mill established in New England.

GOOLD, WILLIAM.

Early paper mills of New England.

New England Historical and Genealogical Register xxix, 158-165 (Apr., 1875).

HOLBROOK, G. H.

David Ames, the first papermaker of the Connecticut valley.

Inland Printer lix, 533-535 (July, 1917).

JONES, H. G.

Historical sketch of the Rittenhouse paper mill.

Pennsylvania Magazine xx, 315-333 (1896).

This article is of special historical interest since it deals with the first paper mill erected in America.

NEW ENGLAND'S papermakers

Harper's Weekly liv, 28 (May 28, 1910).

Some historical facts concerning papermaking and its makers in New England.

WHITAKER, C. H.

Thomas Gilpin's paper machine.

Harper's Weekly lvi, 30 (May 10, 1912).

Concise article showing the value and influence of the Gilpin achievement.

C—Later History.

ADAMS, A. D.

From logs to paper.

Cassier's Magazine xx, 420-428 (Sept., 1901).

Illustrated article descriptive of the largest paper mill in the world (1901) and processes it employs in the manufacture of paper.

DUNLAP, O. E.

Electricity in papermaking at Niagara Falls.

Western Electrician xix, 37-39 (July 25, 1896).

The Cliff Paper Company's mill, the first one, it is believed, to use electricity in papermaking on a large scale.

GREAT NORTHERN paper company's mill.

Engineering Record xlii, 560-566 (Dec. 15, 1900).

Illustrated and somewhat technical article, which gives an idea of what the industry had become at this mill.

LAWSON, P. V.

Papermaking in Wisconsin.

Wisconsin Historical Society, Proceedings, 1909, pp. 273-280.

An illustrated sketch covering important facts in the history of papermaking in the state.

OXFORD paper mills.

Engineering Record xlv, 410-414 (May 3, 1902).

Much of this illustrated article may seem of little interest to the average reader, but from it a conception may be obtained of the importance of the modern paper mill.

PACKARD, WINTHROP.

Making paper in the North woods.

Technical World iii, 601-609 (July, 1905).

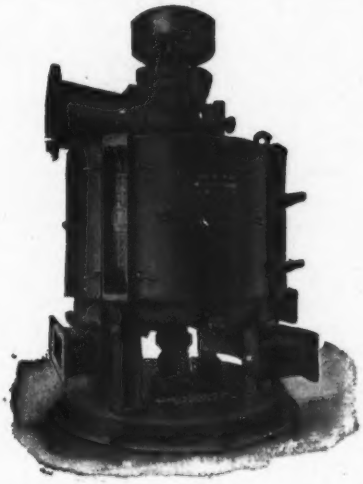
From green spruce to the white newspaper roll; an illustrated article treating of the manufacture of paper at Millinocket, Maine.

PAPER mills.

Pennsylvania—Industrial statistics bureau, Annual report, 1876-1877, pp. 487-499.

A list of paper mills in Pennsylvania, the kind of paper manufactured, and the capacity of each mill.

(*Continued on page* 182)



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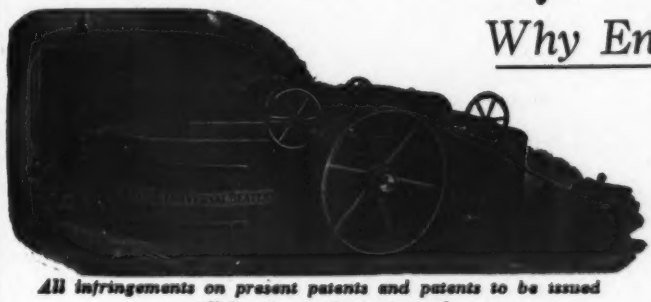

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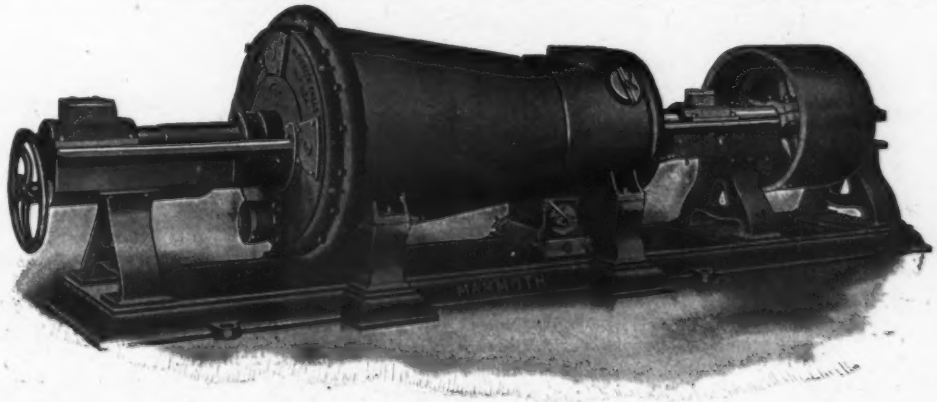

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HISTORY OF PAPER MAKING IN THE UNITED STATES

(*Continued from page* 180)

WILLCOX, J. M.

General report of the judges of group XIII. Paper industry, stationery, printing and book making.

International exhibition. 1876. Reports and awards. 1880. Vol. 5, group XIII. Washington, Govt. print. off.

Interesting today from the historical viewpoint.

STATISTICS.

Books and Pamphlets.

PHILADELPHIA COMMERCIAL MUSEUM.

Paper and pulp. Philadelphia: pub. by the Museum. 1900.

A small pamphlet giving the world's export trade and statistical tables for various countries. For the U. S., it shows the values of the exports of pulp, paper, and manufactures of paper.

PULP and papermaking in Maine.

Maine—Industrial and labor statistics bureau. Annual report 1894, pp. 111-123.

Facts and statistics regarding the industry of the state.

SMITH, F. H.

Study of the Wisconsin wood-using industries. Under the direction of E. M. Griffith and H. S. Sackett. Madison: Democrat print. co. 1910.

Pages 32-33 give statistics of the kind, price and consumption of wood for pulp in Wisconsin.

U. S. *Census office. 12th census, 1900.*

Census reports. . . . Twelfth census of the United States, taken in the year 1900. Washington, United States Census office, 1901-02.

Vol. ix III, pp. 1913-1036, Paper and Pulp, by Charles W. Rantoul.

A special report, prepared by an expert special agent for the U. S., covering the paper mills, pulp mills, and paper and pulp manufactured at the same mills. Not only are comparative summaries given by decades and also by states for two decades, together with other valuable statistics, but some excellent illustrated historical and descriptive material is also included.

U. S. *Bureau of the Census.*

Census of manufactures: 1905. Paper and wood pulp. Washington, Govt. print. off. 1907.

43 p. (Bulletin 80).

Contents: Comparative summary with per cent of increases: 1850-1905; The industry by states; Capital; Materials used; Products; Equipment and capacity; Power; Imports and exports; Progress of the industry; Paper and wood pulp: detailed summary by states, 1905.

U. S. *Bureau of the Census.*

Census of manufactures: 1914. Paper and wood pulp. Washington, Govt. print. off. 1917.

Contents: Explanation of terms; Summary and analysis; Special statistics; General tables.

U. S. *Bureau of the Census.*

Census reports, 1910.

Paper and wood pulp industry (vol. 10, pp. 747-762).

Gives general statistics, special data relating to materials, products, and equipment, and detailed state tables.

After reference to vol. 10, of the above census reports, further text material and statistical reports pertaining to the manufacture of paper in any state noted for its paper industry may be found in vol. 9 (paper and wood pulp statistics) under the name of the state.

U. S. *Bureau of labor.*

Bulletin No. 20, July, 1899.

Contents: The production of paper and pulp in the United States, from January 1 to June 30, 1898. . .

Statistical report given on pp. 546-550 by states and by kinds of paper and pulp.

Articles in Periodicals.

CONSUMPTION of pulpwood.

Science, n. s., xxviii, 119 (July 24, 1908).

Some statistical statements made in regard to the consumption of pulpwood and the amount of pulp manufactured in the United States the previous year, the figures being based upon a preliminary report issued by the Bureau of the Census.

GRAPHICAL comparison of raw and finished products in the printing and papermaking trades.

Sci. Am. lxxxix, 351 (Nov. 14, 1903).

The twelfth census of the U. S. was taken as a basis for working out the graphical comparison made.

IMPORTS and exports of paper, paper stock and books.

Publishers' Weekly xc, 674-676 (Sept. 2, 1916).

Tables are given of figures compiled by the Department of Commerce, showing the amount of the nation's importation and exportation of paper and paper stock during the twelve months ending June, 1916. Comparisons are also made with other years.

(These tables are published regularly by the PAPER TRADE JOURNAL, comparison being made with the preceding year.)

PAPER industry as related to forests and education.

Sci. Am. xcix, 237, 243 (Oct. 10, 1908).

A full page illustration is given on p. 237, the text being on p. 243. Some peculiar facts are given concerning the paper industry and figures are quoted which were compiled exclusively for the periodical.

PULP and paper statistics for 1915, 1916, 1917.

Paper xxi, no. 5, 29-30 (Oct. 10, 1917).

Statistics are given in tabular form.

RECENT paper statistics.

Sci. Am. cxiv, 565-566 (May 27, 1916).

These statistics were taken from a preliminary statement prepared by the Bureau of the Census of the general results of the 1914 census of manufactures.

SURFACE, H. E.

Wood waste and other pulpwoods used in 1914 by United States mills.

Met. Chem. Eng. xiv, 701-703 (June 15, 1916).

Statistics and facts relating to the utilization of wood waste as pulpwood, and other pulpwood data.

TRADE commission continues newsprint hearing.

Publishers' Weekly xc, 2108-2109 (Dec. 16, 1916).

Some statistical data and statements presented by the commission.

ECONOMIC ASPECTS OF THE PAPER INDUSTRY.

This includes the organization of the paper industry, costs and prices, tariff, etc.

Books and Pamphlets.

CAREY, H. C.

The paper question. Philadelphia, Collins, 1864.

Four of a series of letters to Schuyler Colfax regarding the

(*Continued on page* 184)

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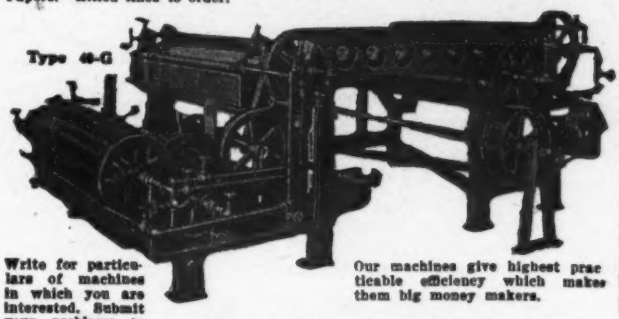

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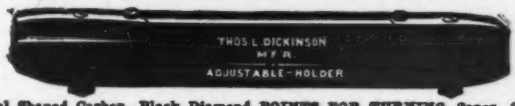

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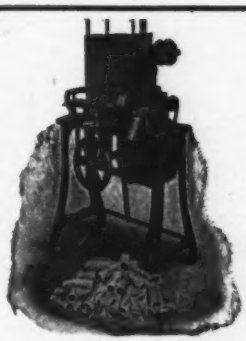

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HISTORY OF PAPER MAKING IN THE UNITED STATES

(*Continued from page* 182)

paper industry in the United States, with special reference to the questions of high price of paper and the duty thereon.

HAUGEN, G. N.

Speech advocating removal of duty from wire fence and wood pulp.

Congressional record xlii, 6484-6490 (1908).

Presents some interesting phases of the wood pulp and paper industry.

SNOOK, J. S.

Newsprint situation.

Congressional record lvi, 1390-1392 (1918).

Address given Jan. 19-20, 1918.

SUPPLY of print paper.

Congressional record lvi. (See Index under Paper for references giving material on this subject.)

U. S. *Congress. House. Select committee under House resolution 344.*

. . . Pulp and paper investigations. . . . Report. Washington, Govt. print. off., 1908.

18 p. (60th Cong., 1st sess. House. Rept. 1786).

Submitted by Mr. Mann. . . .

Report with views of the minority after an inquiry into the elements and conditions involved in the production and supply of wood pulp and print paper in so far as they may be affected by a combination or conspiracy to control or monopolize trade. It contains valuable information in regard to the industry.

U. S. *Congress. House. Select committee under House resolution 344.*

Pulp and paper investigation hearings. April 25, 1908. (Feb. 19, 1919, and Index). Washington, Govt. print. off., 1909.

6 v. 23 cm. (60th Cong., 2nd sess. House. Doc. 1502).

"Preliminary report and Views of the minority": v. 3, pp. 1971-1988.

"Final report": v. 5, pp. 3313-3319.

U. S. *Congress. Judiciary committee.*

Letter from the Attorney General transmitting a response to the inquiry of the House as to whether or not any proceedings have been taken to prosecute the International Paper Co. or related corporations for alleged violation of federal law.

2 p. (60th Cong., 1st sess. House. Doc. 860).

U. S. *Federal trade commission.*

Book-paper industry. Letter from the chairman of the Federal trade commission, transmitting a final report of the findings of fact, together with conclusions and recommendations with reference to the book-paper industry. . . . Washington, Govt. print. off., 1917.

125 pp. (65th Cong., 1st sess. Senate. Doc. 79).

U. S. *Federal trade commission.*

Letter of submittal concerning report on the newsprint paper industry. Mar. 3, 1917. Washington, Govt. print. off., 1917.

12 p.

Gives existing conditions, their causes and some of the findings of the commission.

U. S. *Federal trade commission.*

Report of the Federal trade commission on the newsprint paper industry. June 13, 1917. Washington, Govt. print. off., 1917.

Among the subjects treated are the origin of the investigation, general description of the newsprint paper industry, prices of newsprint paper, costs and profits of manufacture and evidence of the violation of the antitrust laws.

U. S. *Federal trade commission.*

Letter transmitting a preliminary report on the book-paper industry. . . . Washington, Govt. print. off., 1917.

11 p. (65th Cong., 1st sess. Senate. Doc. 45).

U. S. *Industrial commission.*

Report of the Industrial commission on trusts and industrial combinations . . . including testimony . . . etc. Washington, Govt. print. off., 1900-1901.

"The paper combination," pp. lxviii-xcv, 405-447, 750-752, 935; "The wall paper combination," pp. 282-304.

(See also: 57th Cong. 1st sess. House. Doc. 182.)

U. S. *Treasury department.*

Levy of duties on wood pulp, paper, etc. Message from the President of the United States, transmitting information relative to the duties levied on wood pulp, paper, etc. Washington, Govt. print. off., 1912.

7 p. (62d Cong., 2d sess. House. Doc. 416).

Articles in Periodicals.

Canadian Paper Inevitable

Publishers' Weekly lxxvii, 1794 (Apr. 30, 1910).

Indications of much paper to be imported from Canada.

CANADIAN reciprocity and the tariff on books.

Publishers' Weekly lxxix, 822 (Feb. 4, 1911).

Editor's views as to the scheme of reciprocity.

COUNTERVAILING duty accrues on printing paper.

Publishers' Weekly lxxiii, 1331 (Apr. 4, 1908).

Attempts of several dealers in printing paper to evade the imposition of a countervailing duty on printing paper imported from Canada.

CUSTOMS court to pass on paper question.

Publishers' Weekly lxxx, 2532 (Dec. 23, 1911).

Brief article on the troubles ensuing from Canadian reciprocity act.

DECISION against the paper trust.

Publishers' Weekly lxix, 1416 (May 19, 1906).

Regards the General Paper Co.

EDITORS attack alleged paper combination.

Publishers' Weekly lxxxix, 1977-1978 (June 24, 1916).

Claim of various editors that manufacturers of printing paper have formed a combination to advance the price of their paper.

FAWCETT, WALDON.

Activities of the government in behalf of better paper supply.

Inland Printer lx, 371-373 (Dec. 1917).

Shows the various ways in which the U. S. government is endeavoring to solve the problem of better paper market conditions and more equitable prices for the printer.

FEDERAL trade commission reports paper manufacturers and dealers are making unreasonable profits.

Publishers' Weekly xcii, 600-601 (Aug. 25, 1917).

Some facts in regard to the final report of the investigation into the cost of making book-paper.

FIXING the price of paper.

Independent lxxxix, 345 (Feb. 26, 1917).

The outcome of an investigation into the cost of newsprint paper, conducted by the Federal Trade Commission.

FREE paper from Canada.

Publishers' Weekly lxxx, 655 (Aug. 5, 1911).

(*Concluded on page* 186)

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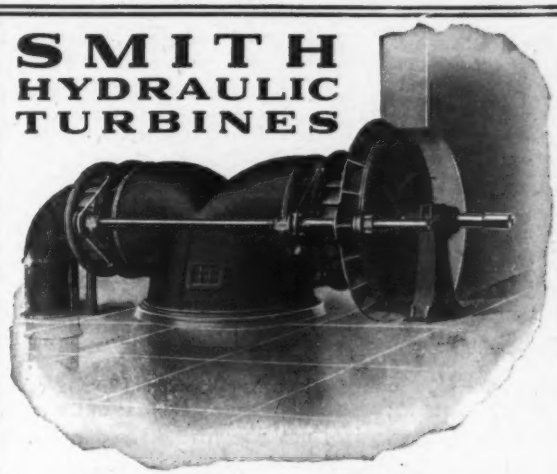

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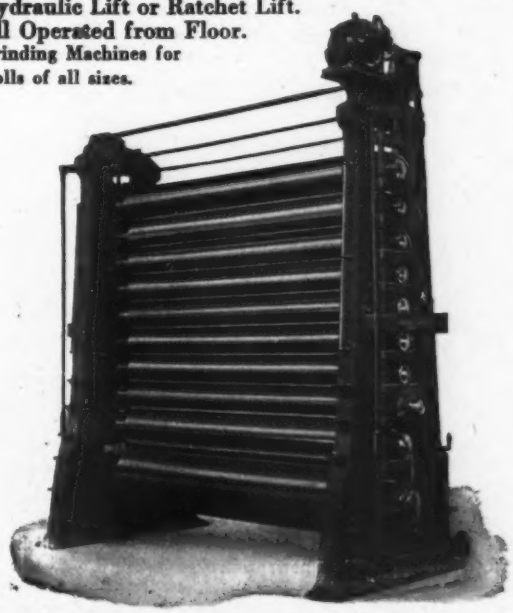

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HISTORY OF PAPER MAKING IN THE UNITED STATES

(*Concluded from page* 184)

Editor writes of matters leading up to the passage by Congress of the bill approving and confirming the agreement with Canada for tariff reciprocity.

GOVERNMENT indicts paper manufacturers.
Publishers' Weekly xci, 1216 (Apr. 14, 1917).
Indictment of several members of the Newsprint Manufacturers' Association on the charge of having violated the Sherman antitrust law.

HESS, R. R.
Paper Industry in its relation to conservation and the tariff.
Quarterly J. of Economics xxv, 650-681 (Aug., 1911).
Contents: General description; Combination and competition; The tariff; Conservation; Conclusions as to the tariff.

INCREASED paper prices not due to increased costs, says Federal Trade Commission.
Publishers' Weekly xc, 1600-1601 (Nov. 11, 1916).
Some statements from the preliminary report.

LYMAN, C. W.
What ought the tariff rates to be on paper and pulp?
Annals of the Am. Academy of Political and Social Science xxxii, 300-309 (Sept. 1908).
The duties on paper are discussed from the standpoint of the paper manufacturer.

MCREA, R. C.
Tax discrimination in the paper and pulp industry.
Quarterly J. of Economics xxi, 632-644 (Aug., 1907).
Advocates reform needed, owing to the existence of inequalities in taxation in the United States. Statistical facts relative to the paper and pulp industry are taken to prove the argument.

MERCHANT, E. O.
The government and the newsprint paper manufacturers.
Quarterly J. of Economics xxxii, 238-256 (Feb. 1918).
Gives facts concerning the papermaking industry from 1910 to 1915. Treats of the rise in prices in 1916 and an interesting account of the government in its work of investigation and arbitration.

MOORE, C. F.
Why book-paper is scarce and the price high.
Publishers' Weekly xc, 1342-1346 (Oct. 21, 1916).
An address.

NEWSPAPER publishers appeal.
Publishers' Weekly lxxiv, 77 (July 18, 1908).
The American Newspaper Publishers' Association attempts to suppress the oppression of the paper combinations.

NEWSPAPER publishers protest against price of paper.
Publishers' Weekly lxxii, 666 (Sept. 21, 1907).
In regard to a resolution passed at a special meeting of the American Newspaper Publishers' Association.

NEWSPAPERS and the tariff.
Outlook lxxxix, 90 (May 16, 1908).
Action taken against the alleged combination of paper manufacturers in restraint of trade.

NEWSPRINT makers ask Trade commission to fix prices.
Publishers' Weekly xci, 624 (Feb. 24, 1917).
Settlement of strife between the newspaper publishers and the manufacturers of newsprint.

NEWSPRINT marketing conditions again under federal scrutiny.
Inland Printer lx, 659-660 (Feb., 1918).

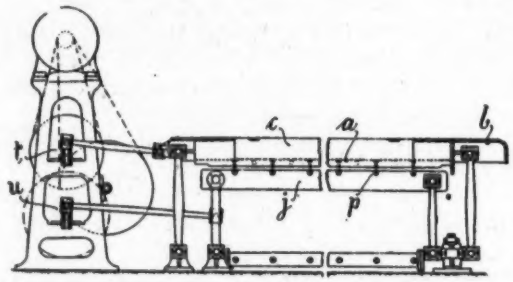
NEWSPRINT paper mills claim every effort to meet demand.
Publishers' Weekly xc, 518-519 (Aug. 12, 1916).
Views of newsprint manufacturers in regard to the paper situation.

PAPER famine.
Independent lxxxix, 95 (Jan. 15, 1917).
Touches on the stress of conditions due to the high cost of newsprint paper.

A New Patent on Washing Stock

Samuel Milne, of Edinburgh, has obtained a patent on a stock-washing machine. Old newspapers, etc., according to the known treatments, are first converted to a pulp, an alkali being applied to bind the oil in the printer's ink. The pulping is to be continued until the fibres have disintegrated and carbon particles become separated from them, ready to be washed off.

According to the invention, the washing is done on sieves or screens. The water is squirted on the pulp from below, permitting



the impurities to drip through the netting of the sieve. It is claimed that this method of washing diminishes the loss of fibre matter.

The same method may be applied to stock after bleaching, or to solid fibres carrying metal, sand or dust.

The woven metal screen or sieve marked *a*, is held by a frame marked *d*. The sidewalls of the latter, marked *c*, are carrying the stock. The frame is moving to and fro, lengthwise. Under frame *b* there is a second frame, marked *j*, holding a number of perforated water pipes, marked *p*, squirting the water upwards. Frame *j* also moves to and fro. The latter is moving more slowly than *a*, thus causing the stock to move towards the end of *a*, there to drop into a container. Both frames are moved by levers, marked *t* and *u*.

Instead of a moving frame, an endless wire screen, running over cylinders, may be employed. In this case perforated water pipes may or may not be replaced by rotating cylinders, perforated.

Red River Co. to Build Pulp Mill

WESTWOOD, Cal., November 10. 1920.—The Red River Lumber Company plans eventually to establishe a plant for the production of pulp for the manufacture of paper, according to General Manager R. F. Pray, who has announced the purchase by his company of a large sulphur deposit in Nevada. He says erection of the pulp mills will await more favorable financial conditions.

Port Huron Sulphite Co. Increases Capital

[FROM OUR REGULAR CORRESPONDENT.]

PORT HURON, Mich., November 12, 1920.—The Port Huron Sulphite and Paper Company has increased its capital stock from $500,000 to $1,050,000. Articles of increase are filed with the Secretary of State.

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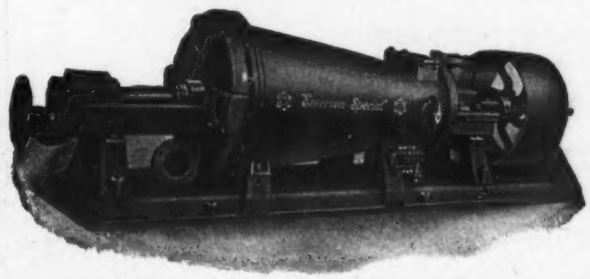

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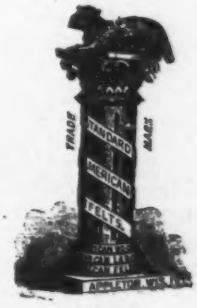

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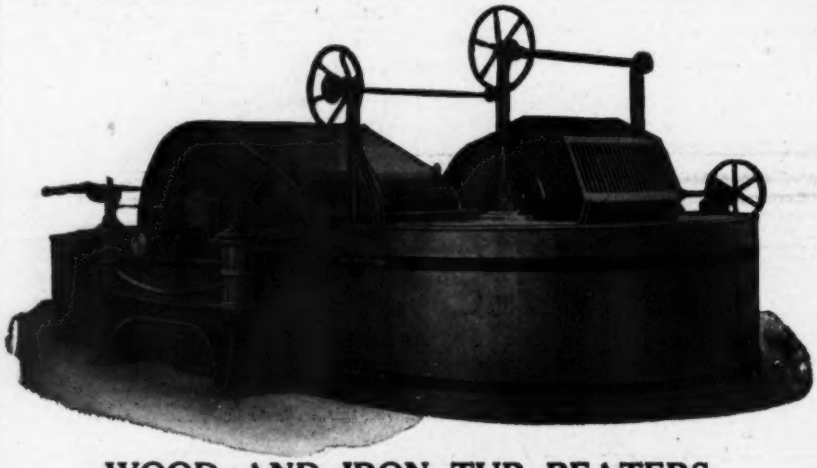

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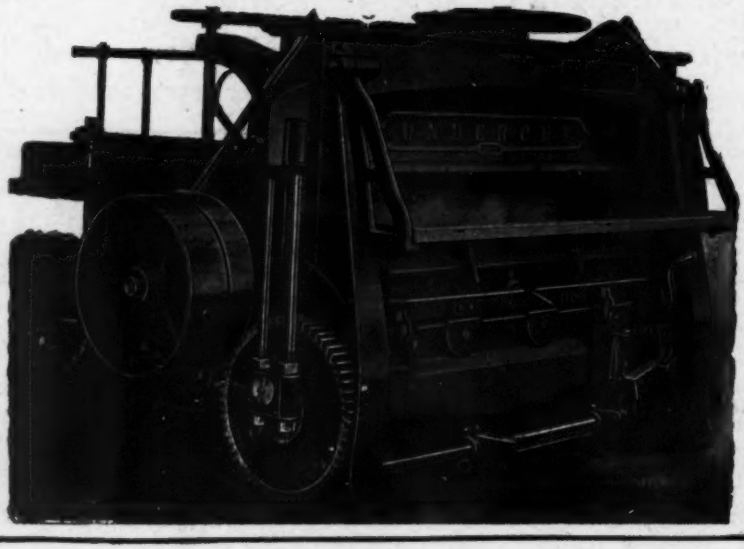

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